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FOOD INDUSTRIES

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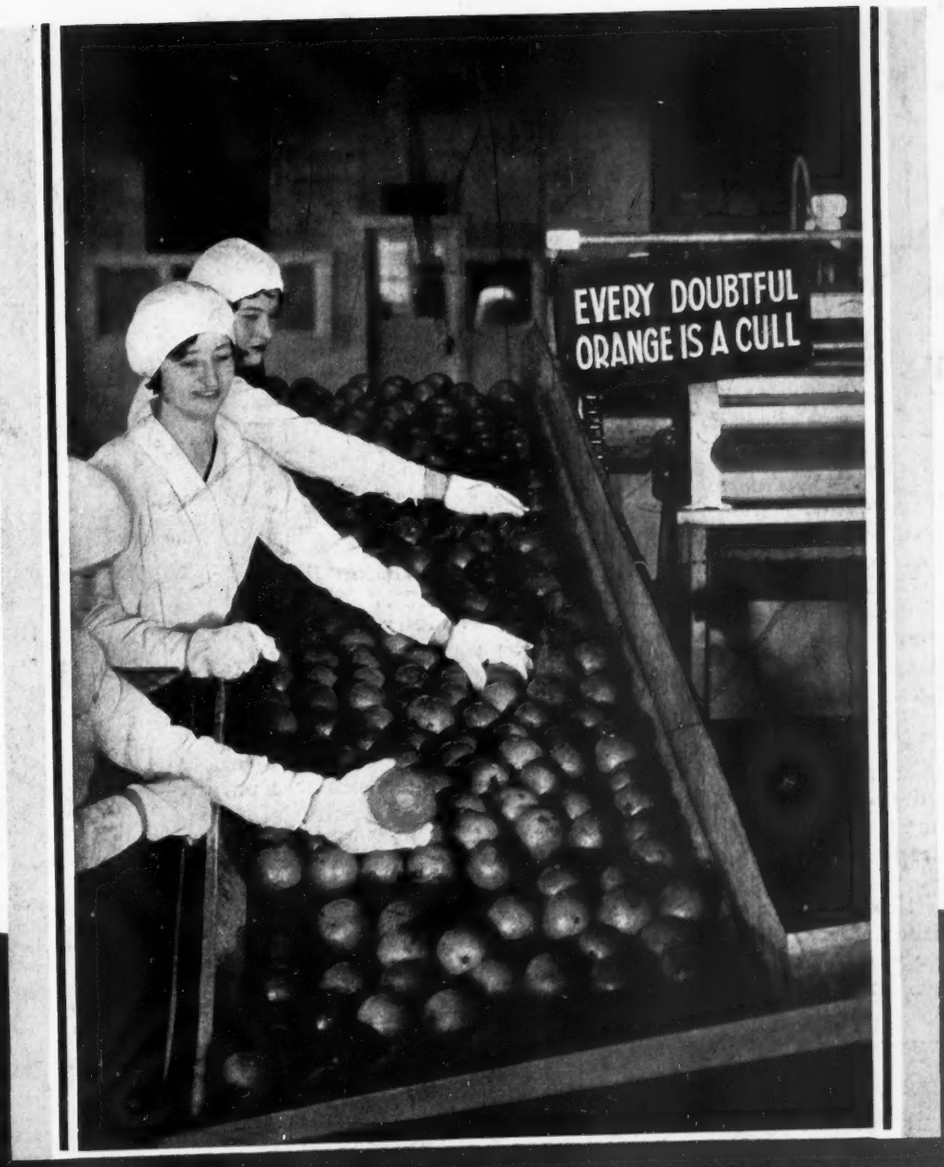

FEDERAL INSPECTION
MAR 24 1931

APRIL
1931

Making Uniform Flour

Canning Pineapple

Trucking Costs

McGRAW-HILL
PUBLISHING COMPANY, INC.

25 CENTS PER COPY

PHILADELPHIA...

The Port for Speed and Economy

The Port of Philadelphia has the facilities for handling foodstuffs of all kinds at a saving of time and labor. Here cargoes are unloaded direct from boat to cars on the dock without lighterage.

Trunk line railroads run their tracks along the dock, and for trans-shipment to points south and west the service is better and rates are lower from Philadelphia than from ports farther north.

The Atlantic Coast states contain 48% of the country's spendable income—$45,802,804,000. This income centers at a point thirty-eight miles northwest of City Hall, Philadelphia. Why not take advantage of this concentration by making Philadelphia your manufacturing or distribution point?

Without cost or obligation this Association will prepare and submit data relating specifically to Philadelphia's opportunity for your business. Please address Department O. on your business letterhead.

Transportation Facilities in the Philadelphia Area
Distribution and Production in the Philadelphia Area
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Philadelphia affords in favorable *balance* all important factors for industrial and commercial progress. These free booklets give the important facts.

PHILADELPHIA

Business Progress Association

1442 Widener Building, Philadelphia

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VOLUME 3

FOOD INDUSTRIES

NUMBER 4

The Journal Devoted to the Problems of the Food Manufacturer

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The greatest names in FLOUR package their products this way

Every year — billions of bushels of wheat are grown, harvested and threshed, milled into flour, and packaged in bags and cartons.

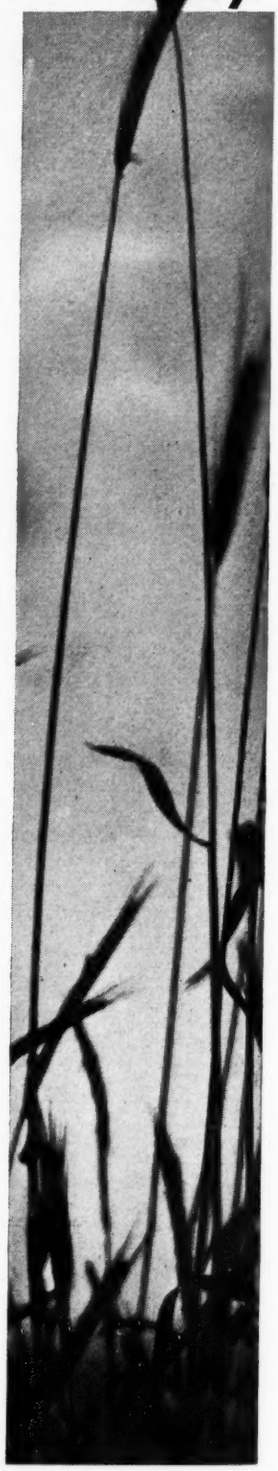
In no other industry is packaging equipment called upon to handle such a tremendous and steady flow of production with greater speed, accuracy, and reliability. Yet, again in flour, as in practically every packaging industry, the largest and best known producers in the country all use the same packaging method . . . Pneumatic Scale Packaging Machines.

When you are contemplating investing money in the purchase of packaging machinery, the packaging experience of the country's largest producers should be a valuable guide to your selection of the best method. It is given briefly and concisely in a unique book entitled . . . "An Interview." Write for it.

PNEUMATIC SCALE CORPORATION, LTD.
Norfolk Downs, Massachusetts

PNEUMATIC MACHINES

Carton Feeders—Bottom Sealers—Lining Machines—Weighing Machines (Net and Gross)—Top Sealers—Wrapping Machines (Tight and Wax)—Capping Machines—Labeling Machines—Vacuum Filling Machines (for liquids or semi-liquids)—Automatic Capping Machines—Automatic Cap Feeding Machines—Tea Ball Machines.



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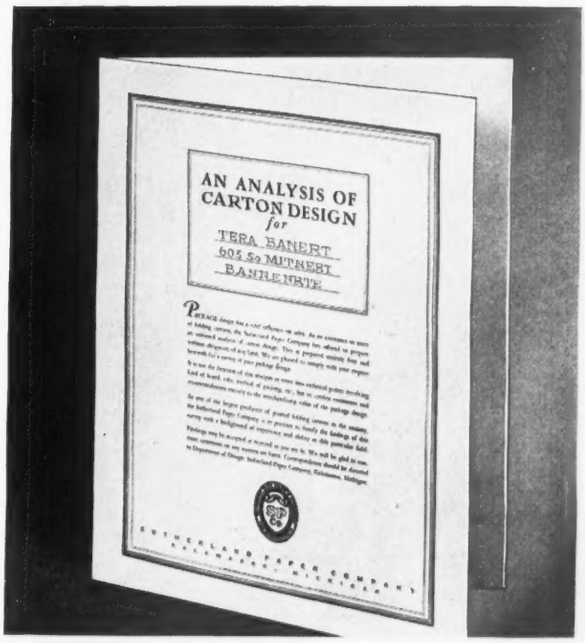
PNEUMATIC SCALE PACKAGING MACHINERY

An Analysis of

YOUR CARTON DESIGN



IN keeping with the current consciousness of sales value in package design, the Sutherland Paper Company has arranged to prepare an analysis of carton design for interested manufacturers.

An outside viewpoint can often prove a valuable aid toward confirming or improving one's merchandising methods. Especially so if the viewpoint is based on experienced judgment.

No obligation of any kind attends this offer. Merely send a sample of your carton (or series of cartons) and we will be glad to prepare a survey of such points as color appeal, art treatment, typography, association with contents, and six other important elements that enter into package design.

Sutherland has been associated with merchandising trends and problems in the folding carton field for many years. Hundreds of well known cartons saw the first light of day in the designing department of the Sutherland Paper Company.

If ever we have reached a period in business when every step in the selling process deserves close scrutiny—it is right now. We will be glad to lend whatever experience and ability we have toward helping manufacturers improve the advertising and sales power of their carton design. Address Department of Design.

Sutherland
PAPER COMPANY
manufacturers of printed folding cartons
Kalamazoo, Michigan

"TOO MANY COOKS SPOIL THE BROTH"

. . . so does poor temperature control

USE *Tycos* CONTROL . . . . . USE *Tycos* CONTROL

A man can fuss and fume trying to get perfectly cooked batches; he can guess at temperatures and pay for loss in damaged products—or he can install *Tycos* Control and avoid even thinking about results of a cooking operation. It depends upon the man.

Those many food processors who depend upon *Tycos* Control wouldn't be without it. Why? It eliminates non-uniform cooking or processing. It controls the entire operation of temperature and time control on one or a hundred kettles. It reduces labor costs. It guarantees a uniform product.

We'll leave the decision up to you, but you had better write for full particulars, and the new edition of the Canners Catalog, Part 500.

The preliminary processes of blanching and exhausting are also important and should have proper temperature control.

Tycos

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.

Taylor Instrument Companies of Canada, Ltd.
***Tycos* Building, Toronto, Canada**

Manufacturing Distributors in Great Britain:
Short & Mason Ltd., London

New York
Chicago
Boston
Philadelphia
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Cleveland
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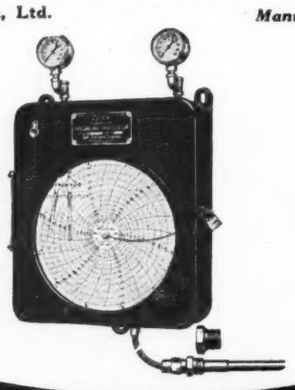
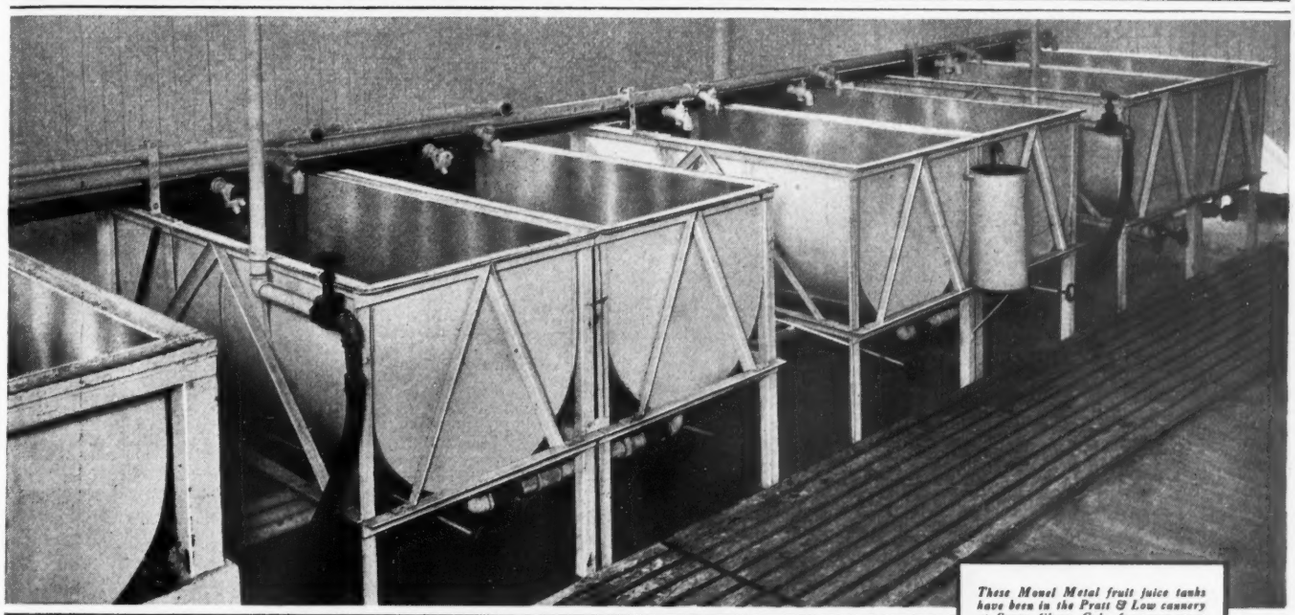


San Francisco
St. Louis
Cincinnati
Tulsa
Detroit
Atlanta
Minneapolis

7-YEAR-OLD MONEL METAL TANKS *still good for years of* TROUBLE-FREE *fruit juice service...*



These Monel Metal fruit juice tanks have been in the Pratt & Low cannery at Santa Clara, Cal., for seven years and are still in good condition. The lines running from the tanks to the filling machines are of Monel Metal tubing 1" and 1¼" in diameter, with fittings of cast Monel Metal. Lines and fittings were made by the PACIFIC METALS CO., LTD., Tanks were lined by the SMITH MFG. CO., of San Jose.

SEVEN YEARS OLD and "still going strong"—that, briefly, is the story of the Monel Metal fruit juice tanks illustrated. Considering this record and the fact that it is representative of general experience, do you wonder that leading canners are thoroughly "sold" on the economy of this corrosion-defying Nickel alloy?

In plants throughout the country, fruit and vegetable juice processing equipment of Monel Metal has proved again and again that it is safe and economical. Monel Metal not only stands up better than any other available material but insures greater product protection together with lower equipment cleaning and maintenance costs.

Because Monel Metal is highly resistant to the corrosive attacks of many fruit juices, including apple, pear, peach, pineapple, etc., it minimizes the danger of product contamination and impairment of flavor and color. Its corrosion-resistance and the fact that Monel Metal possesses a hard, glass-smooth surface also expedite cleaning and thus keep cleaning costs down.

Rust-proof, yet strong as steel, with no coating to wear off, Monel Metal prolongs the life of canning equipment. It will pay you to learn more about this modern Nickel alloy. Write for booklet, "Modern Ideas in Food Plant Sanitation".

MONEL METAL

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Fitting Your Business— Fitting Your Pocketbook

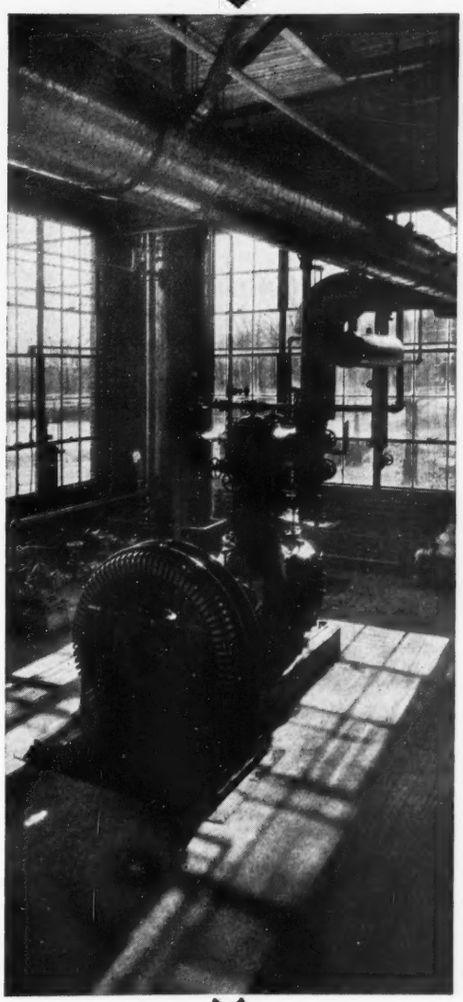
Reo fits your haulage requirements by constantly introducing new ideas in bodies. ¶ Reo fits your pocketbook with economies resulting from its quick acceleration and deceleration in traffic—with further economies resulting from its all-day, all-year, long-life stamina.

Carefully engineered, with friction and vibration reduced — made of finer metals, and the chassis balanced and free of excess dead weight, Reo is needed in your business for the most profitable haulage.

REO MOTOR CAR COMPANY, LANSING, MICH.

SPEED WAGONS REO AND TRUCKS

After the Erecting Engineer *has gone...*



AFTER your refrigerating needs have been studied, the equipment selected, the machinery and coils delivered and set up...

After the erecting engineer goes ...then what?

Then... whether you get the efficient refrigeration you need or not... depends largely on the Compressor.

The York Vertical Single-acting Enclosed Ammonia Compressor is an outstanding York achievement. Its design and refinements, the quality of its materials and workmanship, its precision and husky construction... all combine to make the York Compressor the most dependable, most efficient, most economical compressor you can buy.

In the design and manufacture of this compressor, York has used its 50 year experience in pioneering refrigeration. York has used the knowledge gained through developing and installing refrigeration for every branch of industry and business using refrigeration. The same care in design and manufacture goes into all York equipment.

Thus your own refrigerating problem, will receive from York a solution based on sound engineering and wide experience.

So, after the engineer has gone, if you have York Refrigeration, you are assured the dependability, economy and satisfaction you need. Let York serve you, through the nearest of its 71 direct factory branches.

YORK ICE MACHINERY CORPORATION

» » YORK » PENNSYLVANIA « «

YORK
REFRIGERATION

HUNDREDS IN YOUR INDUSTRY HAVE PROVED THE VALUE OF THIS 1½ TON TRUCK

$595

CHASSIS, F. O. B. DETROIT

There is no guess, no experiment on the part of food distributors who select Dodge Standard 1½-ton Trucks. Business men in your industry and many others have proved the sound value of these modern workers. » » Part-by-part inspection will also prove to you the exceptional quality of these money makers. You will particularly note such desirable features as: 48-horsepower, force-feed lubricated truck engine . . . 4-wheel, internal hydraulic brakes . . . 7-inch frame . . . 4-speed transmission . . . 10-inch single plate clutch . . . full-floating rear axle . . . these and many other features, including precision construction throughout and correct proportioning of each part to every other part. All an assurance of dependability, able performance and long life at low cost. » » See, inspect and test this exceptional 1½-ton truck. You can buy it complete with standard or special body to fit your needs.

Sold and serviced by Dodge Brothers dealers everywhere

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING THE 1½-TON CHASSIS AT . . . $595

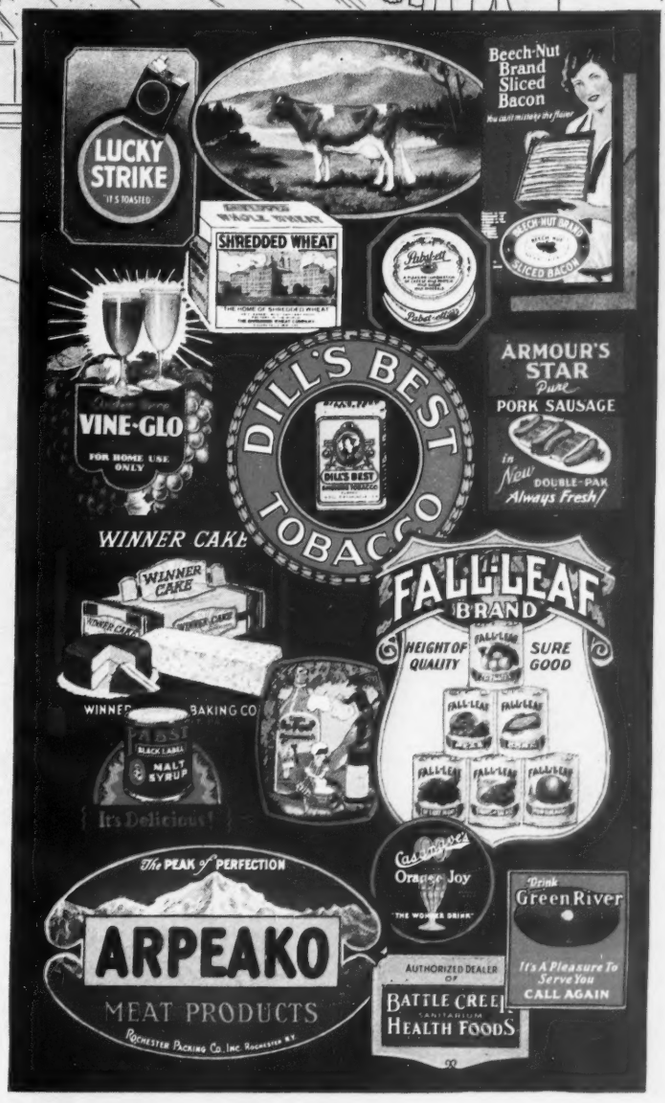
DEPENDABLE DODGE TRUCKS

"Am I my dealer's keeper?"

Modern marketing has placed your dealers in a relatively strong and independent position. The number of nationally advertised products competing for their support offers them unlimited opportunity for selection. And the brands they handle are very largely determined by the sales cooperation that can be expected from the manufacturer.

Today the answer to the question, "Am I My Dealer's Keeper?" is emphatically "Yes," if you want to keep your dealers.

One sure way to keep dealers is to give them on-the-ground, firing-line support by supplying them with Meyercord permanent Top-of-the-Window or Window signs. Amazing results can be obtained from these effective tie-up advertisements at a surprisingly low cost.

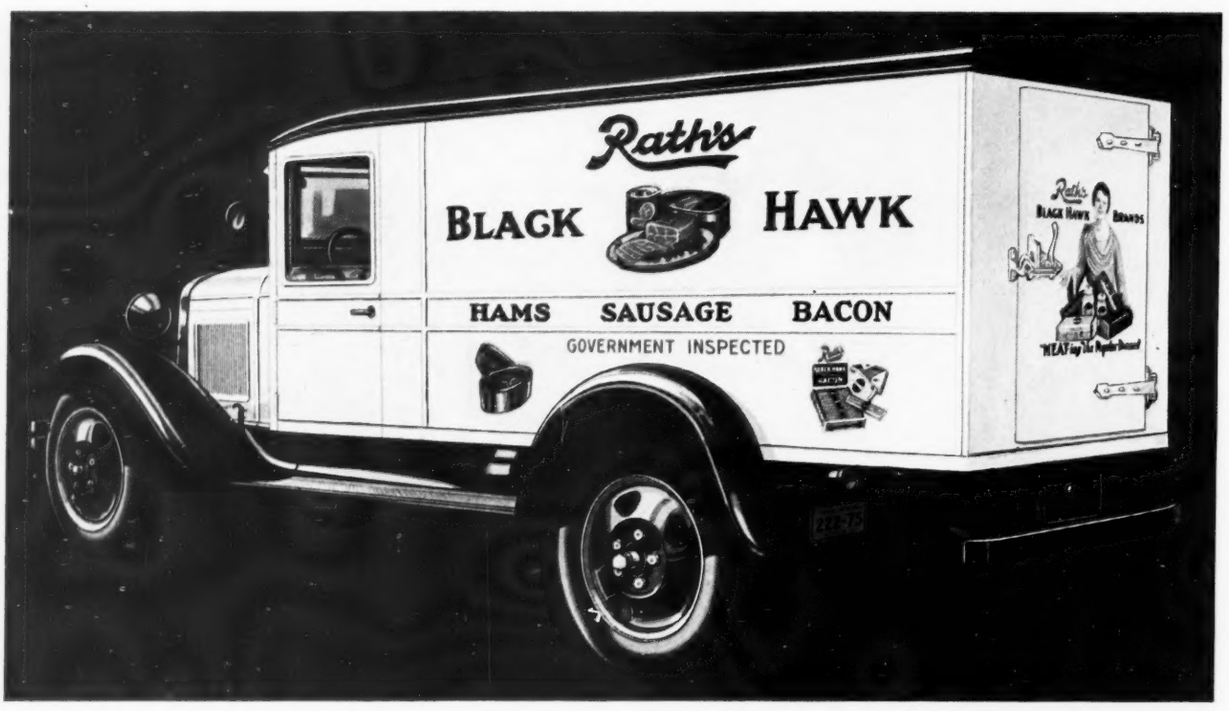


MEYERCORD WINDOW SIGNS

Colorful Day and Night Advertisements

THE MEYERCORD CO., 120 S. LA SALLE ST., CHICAGO

BILLBOARDS ON WHEELS



IF you could have a chain of billboards hand painted by the leading artists of the world, you would obtain no more brilliant or effective traffic display than hundreds of companies are achieving today with Meyercord Weather-Tested transfers on their trucks. For trucks, with their large rent-free sides are really billboards in size and when correctly decorated with trade-marks and tempting product illustrations, have all the force and appeal of colorful roadside signs. Furthermore all Meyercord originals are created by talented commercial artists and consequently the faultless transfer reproductions deliver their messages with telling effect.

The appearance of Meyercord transfers is that of the finest hand painting. In addition to being instantly applied they are washable, durable and permanently effective.

Your present truck advertisements, in colors of your selection, can be reproduced without limit at surprisingly low cost by the Meyercord process. Or if you choose, the Meyercord studios will prepare new designs for you without cost.

MEYERCORD WEATHER-TESTED TRANSFERS

MORE ECONOMICAL THAN HAND PAINTING — MORE ENDURING THAN THE SURFACE

TRANSPORTATION DIVISION — THE MEYERCORD CO., 120 S. LA SALLE ST., CHICAGO

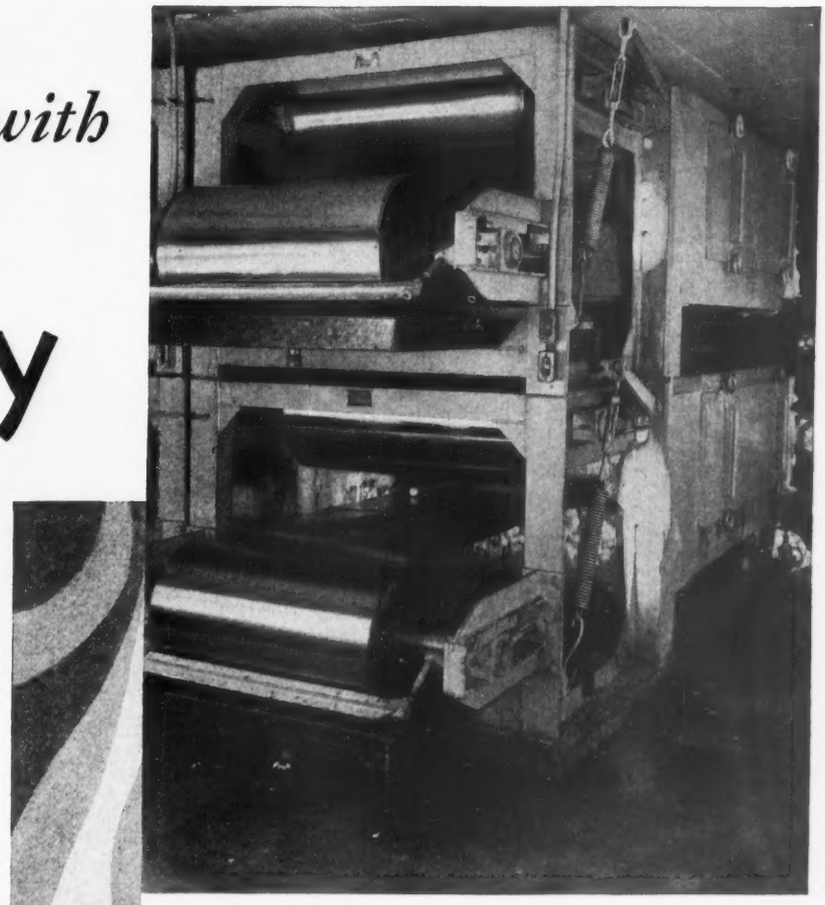
ONLY THIS METAL

could be used with

Safety

Allegheny METAL

ALLEGHENY METAL *now gives double protection, in new brine-spray, freezing process* •



CONTINUOUS CONVEYOR BELTS *of Allegheny Metal transport meat between sprays of brine in this "quick-freeze" machine of Batchelder & Snyder, Boston, Mass.*

TWO important considerations decided the choice of Allegheny Metal for special frozen-meat equipment in the plant of Batchelder & Snyder—subsidiary of General Foods Corp.

First, Allegheny Metal cannot taint food—cannot affect its flavor.

Second, Allegheny Metal withstands the corrosive effects of brine and other agents.

In addition, Allegheny Metal is valuable in food processing because it is unplated—has no thin surfaces to chip or wear through.

It is stronger than mild steel—resists denting and scratching. And, more than that, this durable new alloy cleans as easily as glass—requires no strong abrasives.

Daily, new uses are being discovered for this corrosion-resisting alloy. You'll find Allegheny Metal can help you in your processes. Three minutes is all it will take to drop a line and tell us how you want to bar corrosion in your plant.

ALLEGHENY STEEL COMPANY, Brackenridge, Pa.

Offices: New York, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Philadelphia, St. Louis, Milwaukee, Los Angeles, *Warehouse Stocks:* Joseph T. Ryerson & Son, Inc.—Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia . . . *In Canada:* Samuel & Benjamin, Ltd., Toronto.

ALLEGHENY METAL

Licensed by the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378

CONTINENTAL-ILLINOIS TRUST COMPANY

Employees' Cafeteria; Continental-Illinois Trust Co.
Air is cleaned, cooking odors kept out, by American Air Filters.

CHANGES TO AIR FILTERS AND SAVES $3,465.28 A YEAR

● The question of *whether* to provide clean air for its banking spaces, offices and vaults was answered several years ago by the Continental-Illinois Trust Company, of Chicago. At that time the Company installed an air cleaning system, being fully convinced of the higher efficiency and lower maintenance costs of business quarters ventilated with clean air. The question of *what* air cleaning system to use for greatest economy and efficiency, has been answered by the same company more recently.

Six Months' Trial Convinces

Shortly after installation of their former system, it was discovered that repair and maintenance costs of spray nozzles and circulating pumps, the cost of water and electric current for operating, were high. Before discarding the system, however, which ventilated only parts of the building, an American Air Filter was installed on six months' trial. After the trial the former system was replaced entirely by American Air Filters, and the continued satisfaction of the air filters has led to complete equipping of the building with them.

Comparing the cost of operation and maintenance of the former system with the part of the American Air Filter system that replaced it, the Continental Illinois Trust Company is saving $3,465.28 annually through the use of American Air Filters. Moreover, the American Air Filters are giving a higher degree of cleaning efficiency, as is evidenced particularly in the Company's laundry and kitchens.

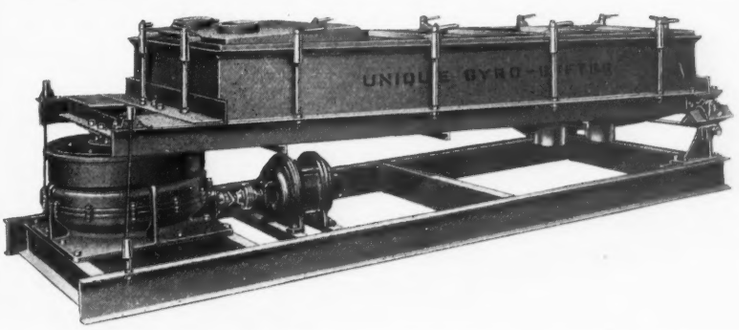
American Air Filters can solve your air cleaning problems in general ventilation and manufacturing processes at minimum cost. Write for free bulletin. No obligation.

AMERICAN AIR FILTER COMPANY, *Incorporated,* General Offices, 117 Central Avenue, Louisville, Kentucky, Factories, Louisville, Kentucky and Bradford, Pa.

AMERICAN AIR FILTERS

Combining the following trademarked products:
MIDWEST; NATIONAL; *and* REED *Air Filters.*

JUST WHAT DO YOU BELIEVE A SIFTER SHOULD DO FOR YOU?



Should it take care of your sifting operation at lowest possible cost and in the most efficient manner? We believe it should. Further, we *know* that the *right* sifter *will* do just that—reduce the cost of sifting operations, and insure a uniform, fine product.

The Unique Gyro-Sifter, with its rapid action, high production and sturdy construction, is the favorite of many manufacturers.

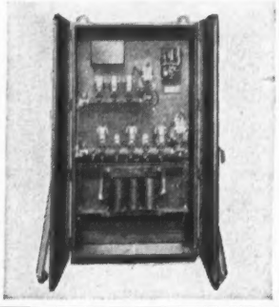
In connection with Unique Mixers and Grinders, Unique Gyro-Sifters complete a smooth, efficient production line. Let us send particulars.

UNIQUE

ROBINSON MANUFACTURING COMPANY
71 Painter St., Muncy, Pa.

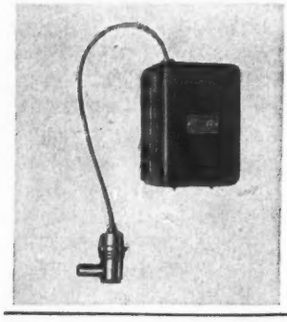
Neglect mending 'twill soon be a small Fault, and a Great One

[The Sayings of Poor Richard]



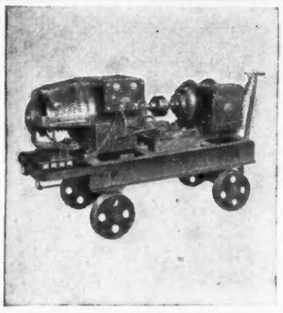
A step in modernization was brought about by the frequent unexplained stopping of a large synchronous motor driving a vital unit in a plant process. Investigation revealed that the too hasty starting of a large induction motor in a remote department caused a voltage dip severe enough to throw the synchronous motor out of step. The substitution of a magnetic controller for the manual controller on the induction motor resulted in uniform starting with minimum voltage disturbance.

Trenches in the snow over buried cables in a mill yard revealed overheating of the distribution system because of low power-factor. The mill power-factor was unity by virtue of a battery of synchronous motors near the substation. Inside circuits with lagging power-factor of 0.72 were improved by substituting, at strategic points, 0.8 leading-power-factor synchronous motors for induction motors. The superseded induction motors were later used, fully loaded and in conjunction with synchronous motors, in an addition to the mill.

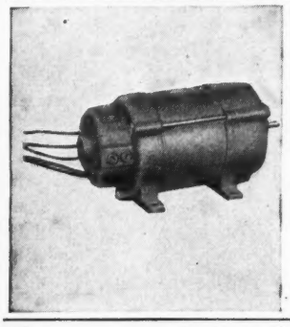


Did you know that a photoelectric tube could be made to do the work of a stop, dog, latch, or cam? Here's an example: A length of pipe is chucked near the middle, no care being taken to locate it. Two motor-driven tool carriages rush in towards the ends and, when one-eighth inch from contact, they slow down to feeding speed. The tools then face and bevel the pipe ends for field welding. The tool carriages act as they do because the pipe intercepts beams of light carried by the carriages. This modern type of cam, dog, etc., involves no maintenance, for a beam of light has no wearing parts.

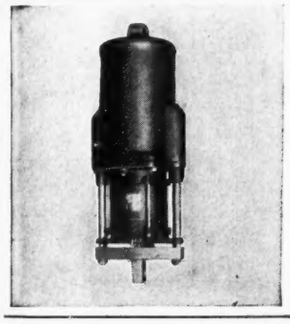
Modern motors designed for quick starts, stops, and reversals, absorb only a small amount of power for their own acceleration, hence leave more for effective work. They are just coming into use for shears, whereon they start, accelerate, execute the work, and stop for each operation. This does away with flywheel and jaw clutch, simplifies the machines, and reduces maintenance. One such machine cuts three 8-in. by 8-in. blooms at a time—fourteen complete cycles per minute. A shear cutting 40-inch-wide material goes through the complete cycle in less than one second. The trend is to let the motor do it.



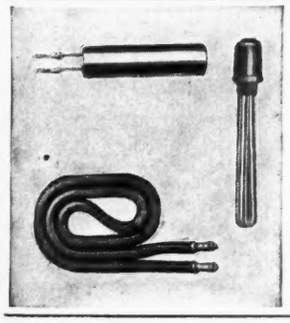
Any manufacturer who still feels that metallic arc welding might not be dependable should take note of the fact that big gun-mounts are being thus fabricated at the Watertown arsenal by the U. S. Government. Modern materials, equipment, and technique have made the arc-welded joint capable of standing any amount of shock duty that the parent metal will stand. Small wonder that manufacturers of machine tools and plant equipment are rapidly changing over their products to arc-welded steel construction and are obtaining a simpler, stronger, lighter, more rigid product with an enhanced appearance that stimulates sales.



The old "layshaft" and other rigid mechanical means for holding related equipment in synchronism while working on a common product are giving away to electric synchronization. Feeders are synchronized with the machines they feed, by Selsyn control, and the units may be any distance apart. To synchronize devices at full speed has never been difficult, but now it is possible to hold many units in absolute synchronism all the way down to dead stop and up again to full speed. This is done on a multiple-unit printing press and so accurately that, if desired, an "i" printed on one unit might be dotted on the next.



Speaking of modernization, have you studied all the possible applications to your equipment of the new G-E thrustor? This electric device exerts a smooth, powerful, constant-pressure thrust with cushioned return. On the up stroke, oil is pumped through a piston by a motor-driven impeller. On the down stroke, the piston sinks through a cushion of oil. Some suggested applications are: (1) the smooth, certain application of brakes to hoists. (2) The engaging of clutches on punch presses or shears. (3) The replacement of muscular effort on foot- and hand-operated machines, thus making the machines "all-electric."



In the past, when a machinery builder wished to build heat into his machines, or a plant engineer wished to apply a limited amount of heat to a process, it was necessary to install a steam boiler, or to run complicated fuel pipe lines to the zones to be heated. To-day, a G-E heating specialist is called in and, after studying the requirements, recommends G-E "Spots of Heat"—handy, self-contained, electric heating units which can be immersed, screwed in, built in, or simply attached to the machinery or equipment to provide clean, safe, odorless, precisely controlled electric heat.

Modernization Reduces Costs—Increases Profit

There are any number of ways in which the G-E sales engineer can help you to modernize. Ask him about them when he calls; or write the nearest G-E office.

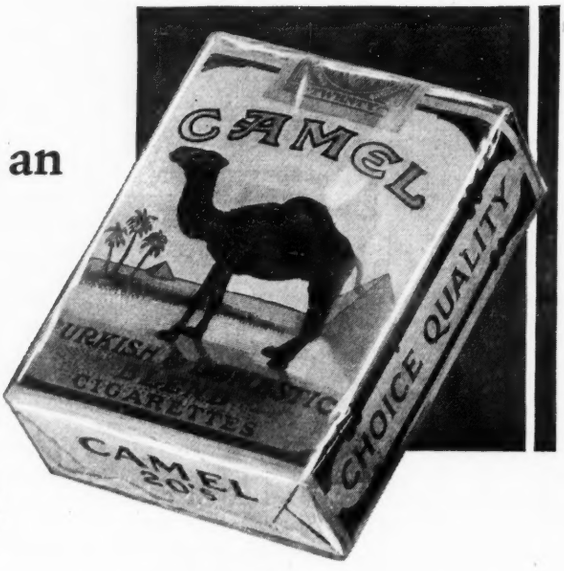
200-463

GENERAL ELECTRIC

The new CAMEL "Humidor Pack"

★

Again we have helped create an outstanding package



HERE is another example of how the Package Machinery Company helps a manufacturer solve packaging problems.

The new Camel "Humidor Pack" required more than the use of a moisture-proof wrapping material. There was also the problem of mechanically *sealing* the wrapping so perfectly that none of the inherent moisture and flavor of the cigarettes could escape through the laps or seams of the wrapper.

The Package Machinery Company met this problem by producing a special TIGHT-SEAL wrapping machine. This new TIGHT-SEAL wrapping gives greater protection against air-seepage than has ever before been possible—with Cellophane or any other wrapping material.

The machine hermetically seals the package by an entirely new method, producing an absolutely air-tight, moisture-proof seal. The result is a package which retains the natural moisture, flavor and aromatic qualities of the cigarettes for the smoker's utmost enjoyment.

You must have noticed, too, what a striking improvement this wrapper makes in the *appearance* of the package. Seen through the transparent Cellophane, colors take on new life and sparkle. The end laps and seams are so smoothly sealed that they are practically invisible. So neat and attractive a package forcefully conveys an impression of *quality*. Men are strongly influenced by this quality appearance—and women perhaps even more so.

Camels is one of many products which have secured new sales advantages by a package improvement—merchandising victories in which our wrapping machines have played a foremost part.

Bring your wrapping problems to us—solving problems built our business.

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts
New York Chicago Los Angeles
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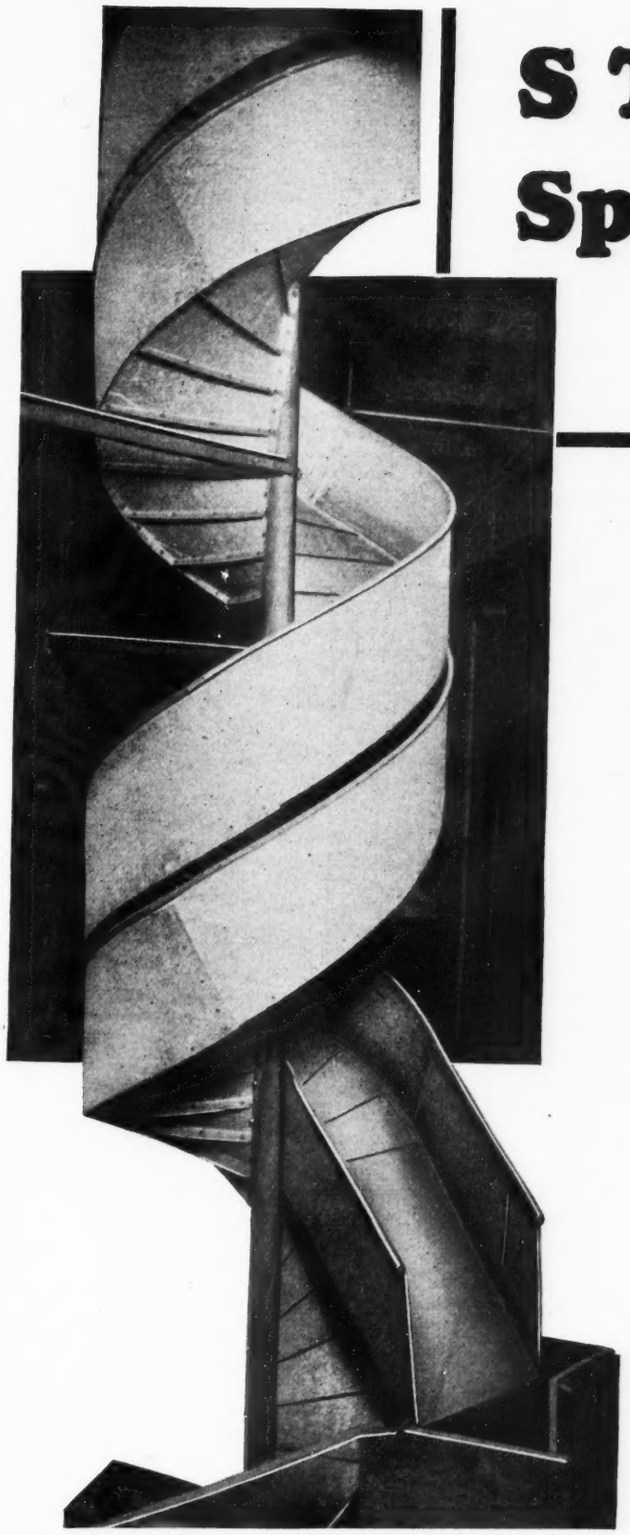

STANDARD Spiral Runways are smooth—

Boxes, crates, bags, sacks, and raw material pass over a smooth surface. This is a result of special Standard construction to insure sanitation, to prevent damage and to speed up the movement of material from floor to floor.

The strong construction and many features of Standard Spirals make them practical for every need where floor to floor conveying is necessary. It is the only spiral constructed with the "down flanged runway." Segments or wings that make up the runway of the Standard Spiral are bent to a 90 deg. angle and bolted underneath.

Let our Conveyor Counselors tell you about the various types of Standard Conveyors. They have solved hundreds of diversified material-handling problems. There is no obligation attached to a request for a survey of your plant.

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NORTH SAINT PAUL, MINNESOTA

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BOSTON, 755 Boylston St.
BRIDGEPORT, 406 Court Exch. Bldg.
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KANSAS CITY, 21 N. Ocean St.
MILWAUKEE, 594 E. Water St.
NASHVILLE, 178 Eighth Ave., North
NEW ORLEANS, 1003 Magazine St.
NEW YORK CITY, 461 Eighth Ave.
OMAHA, 1124 Harney St.
PEORIA, 1303 Peoria Life Bldg.
PHILADELPHIA, 1541 Spring Garden St.
PHOENIX, Post Office Box 145.
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ST. LOUIS, 3104 Magnolia Ave.
SALT LAKE CITY, 204 Dooley Bldg.
SAN FRANCISCO, 4401 San Bruno Ave.
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CANCO

When an outside viewpoint may be "inside information"

With new developments in selling, new methods to replace old ones, doesn't your package merit equal attention? And here most of all is where an *outside* and expert viewpoint can be of valuable assistance. Have Canco package designers and market men study your package, gauge its suitability to your market and your product. These experts, studying your packaging problems as a fresh and vital subject, are sure to render you valuable and timely suggestions.

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....A McGraw-Hill Publication—Established 1928.....Number 4

NEW YORK, APRIL, 1931

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Laurence V. Burton, Editor

Who Won This Fight?

BUTTER has once more beaten oleomargarine in a legislative battle, just as it did in 1902 when the federal tax of ten cents per pound was imposed on colored butter substitutes. We can understand the feelings of both sides of the controversy. Oleo will now pay the price of attracting too much attention to its briefly permitted yellow color in the form of unbleached palm oil; but the industry should not suffer particularly from the new federal law. In this respect it fares nearly as well as it did before the Nov. 12, 1930, Treasury ruling on palm oil. What the margarine industry will suffer, however, from various pending state legislation is another matter. It may be very unfortunate, for history is still in the making.

WHAT SHALL BE SAID of the butter side of the affair? It has gained an advantage, to be sure, but strangely enough the same Congress that passed the Brigham-Townsend amendment to the oleo tax law to keep up the price of butter wound up its affairs listening to the Capper sub-committee complain about the high cost of milk and bread. Apparently Congress wants the cost of bread and milk kept down, but not that of butter. It is significant in this connection that the motivating force for the revised law came not from the butter makers but from the dairy farm organizations. Under the existing awkward circumstances the dairy industry could hardly do else than sit tight and hope for the best.

HOWEVER, through rigidly defining color of oleo in terms of the Lovibond scale, the packing industry also comes in for trouble, for by the new law yellowish oleo oils must either be bleached or the margarine made from them will be required to pay a ten cent tax. This means added cost of packing-house byproduct manufacture, or else the oleo oils must take a tallow or soapstock price, which in turn will be reflected in lower prices paid to the farmer for livestock. According to testimony at hearings on the bill, about $1.50 per head of cattle is the price that will be exacted from the farmer in order to protect the farmer from competition with margarine.

A FURTHER INTERESTING FEATURE of the recent battle, which received scant recognition, is the size of the market for skim milk that is presented by the oleomargarine industry. Roughly, the 350,000,000 pounds of margarine produced annually in the United States requires about 110,000,000 pounds of skim milk, and milk comes only from the dairy industry. And farmers are the largest consumers of margarine.

IN OUR OPINION the butter industry, the packers, the farmers, and the margarine makers are so interdependent and have interests so closely inter-related that they can only lose by fighting. The thing to do is to get together and find a way in which to live together.

Assure Profits by Long-Range Planning

STABILIZATION of employment and profits in business and industry is possible only through future action. Conditions that have gone by cannot be changed, but we can prepare for the future by following a plan that is known to work. Common-sense procedure will result in a condition of business and employment that will be characterized by fluctuations less violent than those of the recent past.

In proposing a code to accomplish that end, published as a supplement to March FOOD INDUSTRIES, the McGraw-Hill company has not introduced new ideas. On the contrary, they are well known and tested. The code serves to bring them together where their mutual dependence can be emphasized and studied.

One of the most important planks in the platform is the recommendation to plan as far ahead as possible for uniform production on the basis of sales requirements already determined. But this requires much careful thought on the relation of the long-term trend of sales to production facilities. It is most unwise to expand production equipment in the mere hope of securing lowered costs through larger production. No one should be so simple as to think that he alone can lower costs through greater production.

Only when an accurate *long-range sales forecast* predicts the need of greater facilities is expansion warranted. Here is the way to avoid the necessity of price-cutting to get volume. If the latest and best equipment is available only in units so large that the addition of a single one of these will give a capacity far above the real needs of the sales department, here again is an occasion for long-range planning that should be co-ordinated with sales possibilities.

How to Get Into Trouble

PRICE cutting is a two-edged sword. Not infrequently it cuts two ways where it is utilized by an industry, in contrast to its use by individuals. Where one industry produces a commodity in competition with another industry, the proper pricing of the lower-cost commodity is a problem that should be approached with consummate skill. This is particularly true where the higher-cost commodity is produced by an industry that is much larger than the producer of the replacing product.

Examples of such inter-commodity competition are seen in dextrose and sucrose; lard and vegetable compound; butter and oleomargarine. A tremendous hue and cry has been raised from time to time about each of these, and today it centers around the inter-industry competition of butter and oleomargarine.

How has this been brought about? We cannot go deeply into all of the factors that enter the fight but we would like to point out that probably the most fundamental factor is that of price. The vegetable and compound shortening people now have their prices on a higher level than lard, and no complaints are heard on that score from lard producers. But oleo has consistently been sold at a much lower price than butter, except at those times, like the present, when prices are demoralized.

It is true that an industry producing a replacement product will grow most rapidly when it is in a favorable price position, but it is also true that this favorable price position may excite dangerous hostility.

Our observations of the effects of severe price cutting are that it will result in any of several actions: (1) It may compel the competitor to do exactly what the price cutter is doing. (2) It may cause the competitor to scrutinize the low-priced product most carefully to discover law violations, dangerous characteristics, and other vulnerable features. This is the way in which a multitude of food law violations are caught. (3) It may result in drastic adverse legislation if the high-cost producer is a powerful industry, like the dairy industry. Unless the low-cost industry exercises great skill in balancing the advantages and disadvantages of offering replacement goods at greatly lower prices, in the longer view the ultimate result is certain to be trouble.

How Long Is a Piece of String?

ON January 20 a general conference on the simplification of cans for fruit and vegetables determined upon twenty-seven standard sizes to take the place of over two hundred now in use. Since then, all interested parties have been circularized in the endeavor to have as many as possible agree to adopt these standards and hold to them.

Arguments have been advanced for and against this restricted list. Without going into the relative merits of the contentions, there is one benefit to be derived from this simplification that is of such importance as to make adoption seemingly inevitable.

The present great number of sizes and shapes makes confusion likely to arise in every transaction in canned foods. A buyer often thinks that he is contracting for a certain size, only to find upon delivery that the cans are slightly larger or smaller than he thought. Certain sections of the country even use the size numbers to mean different things, so that a No. 2 can in one place is larger than a No. 2 in another.

It is to be hoped that the standard size list that has been worked out will be adopted and adhered to rigidly. The merchandising advantages resulting from the better basis of bargaining that will follow such a course will more than offset any factory expenses involved in the change-over. Let a No. 2 can always be a No. 2, regardless of where or by whom it is filled.

Food Fads and Fake Dietetics

A FULL PAGE in a Pacific Coast daily paper was recently given over to an individual who called himself a "bionomist" and to his theory of how human beings should be fed. According to the hodge-podge of perverted nutritional science and impossible chemistry there set forth by the "professor," mankind is divided into types, such as the "hydrogen type," the "oxygen type," the "iron type," *et cetera,* and each type of person should have a special "type" of diet, determined by the "professor," of course, else the results might be serious or even fatal. The three columns of professorial erudition were flanked by display advertising of health food stores, vegetarian restaurants, and the like.

It is impossible to estimate how many persons are impressed by such stuff as this; we hope not many. There can be no quarrel with persons who believe it, belief being a personal matter; nor can we object to the "health-food" stores advertising their wares, for such is their right. But it is certainly not a cheering spectacle for a metropolitan newspaper, and a leading one of its

city at that, to perpetrate such a blatant fake disguised as news. What price "truth in advertising"?

Faddists find it easy to get an audience; newspapers carry their "advice" in syndicated columns, they use up valuable radio wave lengths, and even have periodicals devoted to their notions. Unfortunately, rational dietetics is not nearly as thrilling as one that promises to make a Dempsey out of a physical nonentity, or an Einstein out of a half-wit, by feeding him according to his "type." We feel that it is time that more really rational information about foodstuffs found its way into the daily press; something about the truth of the whole wheat *vs.* white bread controversy, the facts about the sugar and decayed teeth fable, the fallacy of canned goods turning into poison in an opened can, the nonsense about sulphur in dried fruits, and more about the true importance of the vitamins.

Plan to Attend the Chemical Show

ON MAY 4, the biennial Chemical Industries Exposition, usually referred to as the Chemical Show, begins at Grand Central Palace, in New York City. It is worthy of attendance by every production man in the food industries who can find it possible to go.

The Chemical Show is an assembly of the principal equipment used in the process industries, which includes much more than the production of chemicals. The manufacture of sugar, alcohol, yeast, vinegar, starch, malt, and salt, as well as chocolate, cocoa, lard, shortening, edible oils, margarine, extracts, and a host of others, is each just as much a process industry as the manufacture of fertilizers, rayon, lampblack, explosives, gas, hydrocarbons, acids, paper, and all the others that go to make up the great field that is served by our associate publication, *Chemical & Metallurgical Engineering.* Indeed, one is tempted to predict that some day there will be a Food Machinery Show for all the food industries, just as there is now a Chemical Show.

Have You Ever Done This?

WHEN you were a young chap, about twenty-five or thirty years ago and hard times came along, did one of the older men ever call you into his office and point out the true significance of current events? Did he tell you that most business executives live through only one or possibly two—rarely three—major depressions while they are in important, responsible positions, and that the interval of good times between the depressions is so long that most of them forget much of the experience gained in earlier times?

No? Well, nobody ever did it for us, either.

But don't you think it would be an excellent plan for the heads of companies to corral a selected group of their likeliest youngsters and give them the benefit of their best ideas and experience while things are happening? This is their first real depression, and its important lessons should be brought home, if you are to do them a good turn. You will virtually give them the experience of another depression.

If we were to do this job ourselves we would go back to 1929 and recount the ballyhoo then current about our unbounded prosperity and tell them about the signs of the times that then foretold trouble to any who could understand. New, empty houses for sale in great numbers for a whole year meant much. For example, back in May, 1929, we ourselves were offered our choice of three new homes, worth more than $20,000 each, for exactly $1, provided we would assume first and second mortgages for $21,000, one of which was due for payment in 60 days. Taken alone, such an incident is very significant of a trend; but taken in conjunction with other events it spells only one of two things—tight money or building overdone.

If we were in the manufacturing business we would next recount the recent history of the business and something of our various business ratios as they stood early in 1929 and at the end of each succeeding quarter; what the warning signs were that *we* saw; and how the course was changed to meet the changing conditions. Also the group should be told what moves, such as new products or redesigns, were successful, and what were better to have done otherwise. And, did we act quickly enough?

If you, as top executive, choose your group correctly, you will be imparting information of inestimable value to the men who will be important in the control of your concern in 1937-1940.

Save Money by Keeping Out Foreign Substances

THIS is not a bed-time story. When the editor himself bites upon a sharp nail hidden in a slice of bread and nearly ruins his tenderest tooth, it is high time to make a few pertinent remarks on the subject of foreign substances in food. Furthermore, four weeks ago the wife of an employee of this company broke a dental bridge on a wood screw in a canned vegetable, an unfortunate incident which cost him $125 that he could ill afford.

No one suspects for a moment that these foreign substances are the result of anything but carelessness and accident. Yet to permit their constant recurrence is nothing short of industrial imbecility. The high cost of litigation suggests that manufacturers have a big stake in freedom from injurious substances in their products. In one plant with which we are familiar, two sets of separators remove weekly a hatful of bolts, nails, screws, and other trash from the product. Nobody knows just where they come from, particularly the roofing nails that constantly reappear. The point is that this concern continuously removes the possibility of future trouble.

But iron and steel products are not all that find their way into foods. We have seen cinders, brass, bronze, rubber, glass, wood, strings, and many other foreign substances. Yet the tale does not end here. Last summer, several persons were killed by sodium fluoride—bug poison—which accidentally was spilled in the wrong place in a bakery.

It is the duty of food manufacturers to exert themselves to the utmost to guarantee absolute freedom from foreign substances. To be sure, it will cost money! But when thinking about the expense, ask yourself if you ever heard of an action at law being called off because the defendant did not like the expense of the case.

The way out is to provide plants with the best automatic equipment available in the form of magnetic separators and inspection belts. The solution of the problem does not end here. It calls, further, for a careful survey of the premises and machinery and a plan of systematic inspection to prevent parts of equipment from working loose and falling into food. Eternal vigilance is the price of success in this effort.

Fig. 1 — Mixing equipment and finished test loaves in the experimental bakeshop

Technical Control in Milling

GIVES UNIFORM FLOURS

By C. G. HARREL
Director of Laboratories
AND
R. E. McCORMICK
Laboratory Service Division
Commander-Larabee Corporation
Minneapolis, Minn.

THE controlled production of flour depends largely upon three factors: a suitable wheat blend, proper conditioning of the wheat for milling, and uniform milling practice. These factors have gained such recognition that the milling industry has, in the past few years, taken many steps of a scientific nature to place on the market flour which will meet the demands of the most discriminating baker.

An adequate supply of suitable raw material is insured through a pre-harvest survey of the territory from which the wheat is to be drawn. This work is followed by securing representative samples from different stations immediately after harvest, and these samples are then sent to the laboratory for experimental milling and baking tests. The methods used in cleaning, conditioning, and milling these station samples are as similar as possible to those employed in the commercial plant. The following information is obtained from the experimental milling test: the per cent of patent, clear, and low-grade flour, and the per cent of bran and shorts the wheat being tested will produce; also the yield per barrel or the number of bushels of wheat required to produce a barrel of flour. Following the milling of the samples, the flour is analyzed for ash, protein, moisture, and a baking test is made. A program similar to the above is carried on throughout the crop year to obtain all the information possible about different stations and different lots of wheat.

From the information gained through the experimental milling and baking tests, milling concerns are able to build up adequate supplies of wheat with known milling and baking characteristics. This information, together with an analysis of the flour, makes it possible to maintain a uniform blend throughout the year. With the uniformity of his raw material assured, the miller is able to produce a uniform flour.

To show the desirability of such practices, it was found that samples of No. 1 dark Northern spring wheat, from 100 stations located in 44 different counties of a leading wheat-producing state, showed the following results: 14 per cent of the samples produced flour with excellent baking characteristics; 9 per cent, very good; 48 per cent, good; 9 per cent, fair; and 20 per cent produced poor results. These figures are especially significant, in view of the fact that they were obtained on the 1930 crop, this crop being conceded in general to be considerably above the average in quality.

Probably the next most important step in the manufacture of cereal products after the proper selection of the raw material is conditioning the wheat for milling. After the wheat has been thoroughly cleaned in the various cleaning machines it is ready for tempering. This may be defined as the process of preparing wheat for milling by the addition or removal of moisture. The

purpose is to facilitate the separation of the endosperm, or floury portion of the grain, from the bran and germ, or embryo. It has been found that a certain amount of moisture, with sufficient time to allow the moisture to penetrate the kernel completely and uniformly, greatly increases the differences in the physical characteristics of various portions of the wheat kernel. The endosperm is made more friable, rendering it more easily reduced, and the natural toughness of the bran and the germ is increased, so that they are less easily abraded or pulverized. Thus we see the need of quick, accurate moisture-determining devices to aid in controlling the tempering process.

Until recently, the moisture on all tempered wheat was measured either by the Brown-Duval or the oven method; but in the past year electrical instruments have been devised for measuring the moisture content in the wheat. One of these instruments measures the conductivity of the wheat when it is being crushed between two electrodes, while another measures the dielectric constant of the wheat. Both instruments may still be classed as being in the experimental stage; however, very good results have been obtained with them and no doubt they will aid greatly in controlling the moisture content of the tempered wheat.

FROM the wheat selection program outlined above, the products control department is able to determine standards to be maintained throughout the year and, as far as crop conditions will permit, to maintain the same standards from year to year. In order to maintain these standards, accurate control of wheat blends is necessary. When the wheat is received at the mill, each individual lot is binned according to the protein content and its milling and baking characteristics. The laboratory furnishes this information and specifies percentages of each lot to be used in maintaining uniform quality. In addition, the laboratory department constantly checks the finished product to insure uniform quality being delivered to the customer. This is done by making ash, moisture, protein, and baking tests during the course of manufacture. The ash test furnishes the miller with information as to the correct operation of various machines and also serves as a factor in classifying the numerous flour streams in the mill. The keeping quality of flour in storage is governed to a large extent by its moisture content. The government specifies that flour shall not exceed 15 per cent moisture as determined by the vacuum oven method. The protein and baking tests on the finished product serve as an index to the proper

Fig. 2—Analytical laboratory for flour-mill control recently installed in Minneapolis plant of Commander-Larabee Corporation

Fig. 3—Equipment in the experimental bakeshops of modern milling laboratories is a small-scale duplication of that found in commercial bakeries

blending of the wheat and, to some extent, to the uniform operation of the mill.

Flour milling may be defined as the separation of the outside, branny covering of the wheat berry and the germ from the endosperm or floury portion, and the reduction of the endosperm to flour. In the usual five-break, seven-reduction mill, this involves the making of some 32 different grades of flour. These streams are blended in various ways to make the different flours found on the market. This may be done with two primary objects in view: first, the building of a flour to numerical specifications, a flour with a definite ash, moisture and protein content; second, the building of a flour with uniform baking characteristics. Flour is mainly used for the making of bread. Thus, it would seem that to build a flour with uniform baking characteristics is the most important course to follow.

As shown in the accompanying table, as we go from the lower ash patent streams to the higher ash clear streams, the volume of the loaves increases progressively. If the miller is to maintain a definite ash in any particular grade it is sometimes necessary to cut one or more of the border line streams of flour—for example, stream No. 11—in or out of the grade being made. By this practice, the baking characteristics of the flour are changed as the number of streams going to make up the grade are changed.

Analysis of Representative Streams

Stream		Moisture Per Cent	Ash Per Cent	Protein Per Cent	Fermentation Volume Short Cu.In.	Fermentation Volume Long Cu.In.
Pat.	No. 1	14.4	0.35	12.26	115	121
	No. 3	13.9	0.37	12.27	120	135
Border	No. 11	15.0	0.55	17.05	125	143
Clear	No. 14	12.5	0.71	15.01	135	141
	No. 18	12.8	0.75	15.54	132	156

Figs. 4 and 5 present the results obtained from the low ash patent stream No. 1 and from stream No. 11, known as a border line stream. In each case, one-half of a 3½-hour fermentation loaf is on the left and one-half of the loaf obtained with an hour longer fermentation is on the right. In Fig. 4, it can be seen that there is very little difference between the loaves, but in Fig. 5 we get an entirely different picture. Here the volumes are greater and the increase in volume on the long-fermentation loaf is very noticeable. Now, in order to meet low ash specifications in a patent flour, it sometimes becomes necessary to shift stream No. 11 from the patent to the clear, with the result that a certain definite amount of resistance to sustained fermentation has been exchanged for perhaps 0.01 per cent ash. It appears then, at times, that it is a

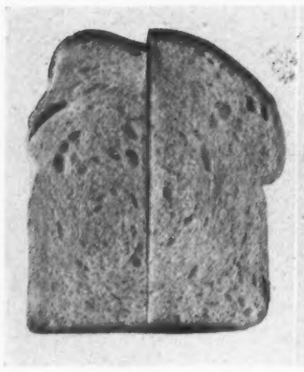


Fig. 4—Bread containing flour from stream No. 1

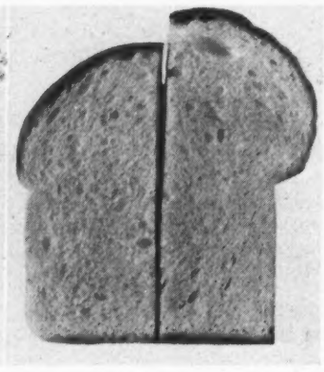


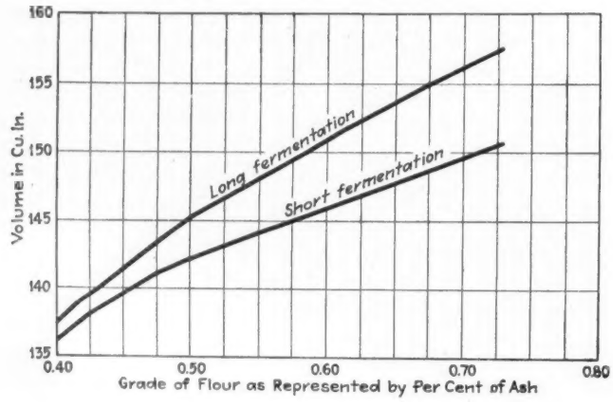
Fig. 5—Bread containing flour from stream No. 11

mistake to impose too rigid ash specifications on a grade of flour.

This point may be further brought out if we present baking results on three different grades of flour over the period of a year. From 100 bakes on a short patent flour carrying 0.40 per cent ash and 12.2 per cent protein, the volume averaged 136.5 and 137.3 cu.in. for a 3½-hour and a 4½-hour fermentation period, respectively. From the same number of bakes on a straight grade flour, an average volume of 141.7 and 143.8 cu.in. for the short and long fermentation was obtained. These flours averaged 0.48 per cent ash and 12.8 per cent protein. The same information was obtained on 100 clear flours having 0.78 per cent ash and 15.2 per cent protein which produced volumes of 150.7 and 157.5 cu.in. for the short and long fermentation periods. These data are presented in Fig. 6. A casual glance shows immediately that the higher ash grades possess a marked advantage in volume and resistance to increments of fermentation. It is further seen here that the higher ash, clear streams which are blended with the patent streams to make so-called long patent and straight grades of flour have exerted their greater stability to a measurable degree.

To summarize the above discussion, we have considered the following factors in the scientific control of flour manufacture: First, the wheat selection program, including the pre-harvest survey, securing of representative samples from the wheat-producing areas, and milling and baking analysis of the samples. Second, the building up of standards for different grades to be maintained throughout the year. Third, the control of the wheat blends, wheat conditioning, and the final check-up on the finished products to insure their uniformity.

Fig. 6—Curves showing relation of grade of flour and fermentation period to loaf volume



Controlled Mixing Gives Good Self-Rising Flour

By M. L. ROBERTS
New York City

ONE of the simplest manufactured products in the cereal field is self-rising flour. It is easy to manufacture, because only the two essential operations of mixing and packing are involved. The laboratory control of such a product, however, is far more complicated and difficult.

This discussion will include the topics of materials, equipment, and manufacturing process. The first- and last-named items will also include salient features of quality control.

Materials

A high grade of patent flour is used as the basic ingredient. It is bought from the soft-wheat miller on the basis of specifications which are changed from year to year to conform to the varying characteristics of the wheat crop. Specifications include moisture, protein, ash, and quality of bleaching (when "Beta Chlora" is used as the agent). The value of ash percentage is specified on a fixed moisture basis of 14.5 per cent.

Tests made on the flour include the usual "slick," moisture, ash, protein, and bleaching agent. The last-named is quite important, because various bleaching agents have different effects upon the physical and chemical properties of the flour so treated. For example, a wide variation in quantity of "Beta Chlora" used to bleach the flour will give not only an equally wide variation in color but also a wide variation in cake-baking qualities. In fact, this item is so important that it should be determined for each year's wheat crop by making a series of baking tests in order to determine the optimum quantity to be used; e.g., 1½, 2, or 2½ oz. per barrel. Once the desired treatment has been ascertained and specified, it may easily be determined on each flour delivery by titration (simple or electro-metric) of water extract for acidity, or by a less refined but practical spot test described in *Cereal Chemistry,* vol. 6, pages 162-3.

The salt also is bought on the basis of specifications. Various protective agents, or "driers," are used in salt to protect it from the water vapor always present in the air, and thus keep the salt in a free flowing condition. Magnesium carbonate and tri-calcium phosphate are commonly used as driers. Experience has shown that approximately one per cent of tri-calcium phosphate is the best "drier" for salt, especially for self-rising flour. The laboratory makes a qualitative test according to standard methods for this drying agent. The alkalinity in the salt is determined by usual titration with standard acid. A small quantity of alkalinity present is permissible, but it is obvious that too great a degree of alkalinity in the salt would throw the adjustment of acid and basic leavening agents off balance enough to do more or less harm to the product. The granulation of the salt should be such that it intermixes completely with the flour. This is secured if it passes through a 60-mesh screen.

Some manufacturers prefer to use cream of tartar exclusively as the acid ingredient of the leavening agent; others prefer exclusive use of calcium acid phosphate for this purpose. Each material, however, has its advantages

and disadvantages. It must be admitted that a cream of tartar self-rising flour gives a better biscuit, but usually a phosphate self-rising flour yields better cakes. Therefore, for a general-purpose self-rising flour, a chemically equivalent half and half mixture of tartrate and of phosphate as the acid ingredient of the leavening agent is the most desirable combination.

The specifications for calcium acid phosphate include granulation and neutralizing value. The laboratory determines the neutralizing value by titration with standard alkali according to the regular method used by cereal chemists. This value should run close to the standard in every delivery, else the flour will give an acid bake with a high value, or possibly an alkaline bake if the value is too low. In case a shipment of phosphate is found to have a different neutralizing value from that which has been specified, the material can be used if proper adjustment of the quantity used is made.

The purity of the soda, and hence its "baking strength," is determined by the usual titration method. The cream of tartar is titrated with standard alkali for purity. Both of these tests are described in the U. S. Pharmacopeia.

Equipment

Scales for weighing chemical ingredients should be sensitive to $\frac{1}{16}$ oz. Individual containers for each ingredient are desirable, and when filled should contain approximately the formula weight of that ingredient.

A convenient mixer holds 800 lb. of flour and is cylindrical, being placed horizontally. The mixing blades turn over about 70 r.p.m. At the bottom of the hopper feed to the mixer is a screen over which a brush turns so that soft lumps of flour or of other ingredients are broken up. The capacity of the mixer should not be crowded—that is, filled too full—as this will result in dead spaces, or "islands," of flour remaining in the corners unmixed.

The flour is conveyed from the mixers to a dumping bin, and thence to the reels over a fine silk cloth, where small lumps such as large salt crystals and "shot balls" are removed. The product is now ready for packing and is conveyed to a bin located just above the packing machines.

Automatic scales weigh the required quantity of flour for each package. The cartons are filled, "shaken down," sealed, and packed into cases.

Process

The use of individual containers for each chemical ingredient is a precaution to avoid mistakes. The order of addition of the chemicals to the mixer is a point worthy of mention. The acid and basic ingredients are not added at once to the flour. For example, three sacks of flour are added to the mixer, then the phosphate and cream of tartar are added. During the addition of the next three sacks of flour to the mixer, the chemicals already added have had time to become coated with flour, so that when the soda and salt are added next, no appreciable chemical reaction between them will occur, with consequent loss of leavening gas. Finally, the last two sacks of flour are added to the mixer.

The mixing time may vary from 15 to 30 minutes, depending on variables such as batch size and the type of agitator, as well as its speed. Obviously, the shortest mixing time compatible with a uniform admixture of ingredients is desirable, for a shorter time cycle means greater productive efficiency. For example, in one plant it was found that without any changes in equipment, the mixing time could be cut from 25 minutes per batch to 15 minutes per batch, thus increasing the capacity $66\frac{2}{3}$ per cent for the same output of power.

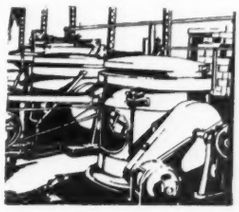
The shorter mixing period cannot be adopted without appropriate tests to insure uniformity of mixing. A trial batch of shorter mixing time may be made. Samples should then be taken from the conveyor as the flour is dumped, being sufficiently frequent so as to insure a representative sampling from the beginning of the stream to its end. These samples are then analyzed for their carbon dioxide content. A wide range of values indicates improper mixing, due to too short a mixing time.

A sample of each complete mix of flour is sent to the kitchen for a baking test some five minutes before it is dumped. A biscuit is made, which will show whether or not all ingredients are present in approximately the proper proportion. The result would be apparent if soda or tartrate or phosphate or salt were omitted or if, by mistake, one ingredient were substituted for another. After the kitchen passes the batch, it is released for dumping and subsequent packing.

Periodic tests of the packed flour should be made to check the factory production. Test cakes are baked to prove that the desired high standard of quality is being maintained. At such times the carbon dioxide content also is determined. This value varies from 0.50 to 0.80 per cent (or higher), depending on the formula used.

The cartons used for packing should be of good quality, lest off odors and flavors of the flour result. The flour should be stored in a cool, dry place. Both heat and dampness cause a deterioration of the leavening agents, and finally result in destruction of the gas-forming power.

The mechanical part of the manufacture of self-rising flour is easy. Both the laboratory and kitchen, however, must keep close watch on the quality of all the incoming materials and their handling, as well as upon the finished product, to insure the maintenance of a quality standard



Successful PINEAPPLE CANNING *Depends on* CLOSE PRODUCTION CONTROL

Harvesting pineapples in Hawaii

By ANDREW FARRELL
Honolulu, T. H.

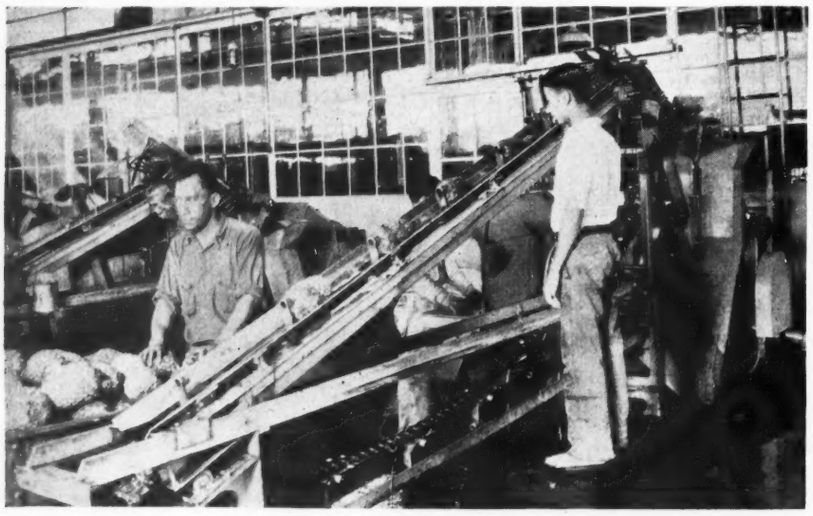
PINEAPPLE packing in Hawaii is a large business with many ramifications. Not only do the packers can the fruit; they also grow it. The Hawaiian Pineapple Company, for example, raises more than 99 per cent of its entire pack. Pineapples are not picked until ripe, and must be canned promptly, in order to retain maximum flavor. This results in serious problems that must be solved by both field and cannery. For example, in one 24-hour period, July 7, 1930, the plant of the Hawaiian Pineapple Company in Honolulu packed 94,085 cases of fruit, or 2,063,473 cans.

The plant of the Hawaiian Pineapple Company in Honolulu may be taken as a representative pineapple cannery, though hardly typical, for it is the largest by far, only Libby, McNeill & Libby and the California Packing Corporation vying with it. Consequently various facts are true of the Hawaiian Pineapple Company plant that are not true of the smaller canneries.

Men truck the fruit, five lug boxes at a time, from the cars to a covered receiving platform. Within a few minutes the pineapples, crown end first, are being fed by hand into the Ginaca machines. In its original form this machine was invented by H. W. Ginaca, an employee of the Hawaiian Pineapple Company. Because of many improvements, he would hardly recognize his invention today, although the basic ideas persist. He sold his patents to the Hawaiian Pineapple Company, which manufactures the machines and sells them to packers throughout the pineapple countries.

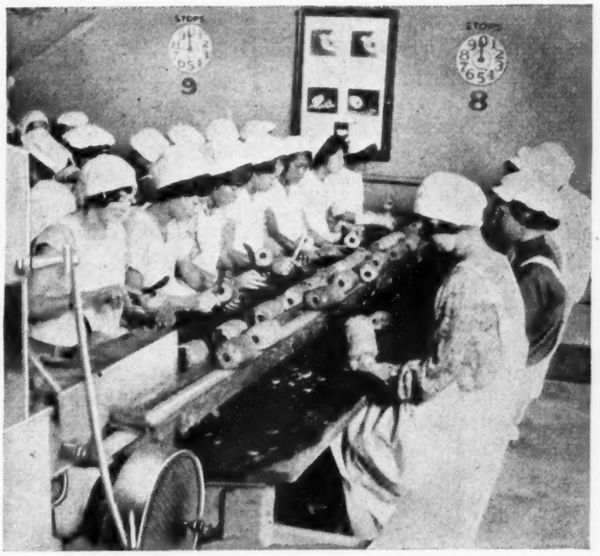
The pineapples enter the Ginaca by means of a chain conveyor, each being counted automatically. Then the machine trims them to cylinders of a predetermined size; it slices off the ends; it cuts out the core—and does all this at the rate of 85 per minute for Nos. 1 and 2 fruit, the largest in plantation terminology, and at the rate of 110 a minute for No. 3 fruit.

Pineapples fed into this Ginaca machine are discharged as cylinders of fruit, with shell and cores removed



The pineapple is not a perfect cylinder and when trimmed to a cylinder, so as to be packed in cans, much fruit which must not be wasted remains in the curve of the shell. Consequently, the Ginaca takes the shell, which has been split into two parts, strips out the remaining fruit, and drops the shells into chutes that convey them into another part of the plant.

Each of the three sizes of fruit, as they are sorted in the fields, is trimmed to fit a certain can. No. 1 fruit



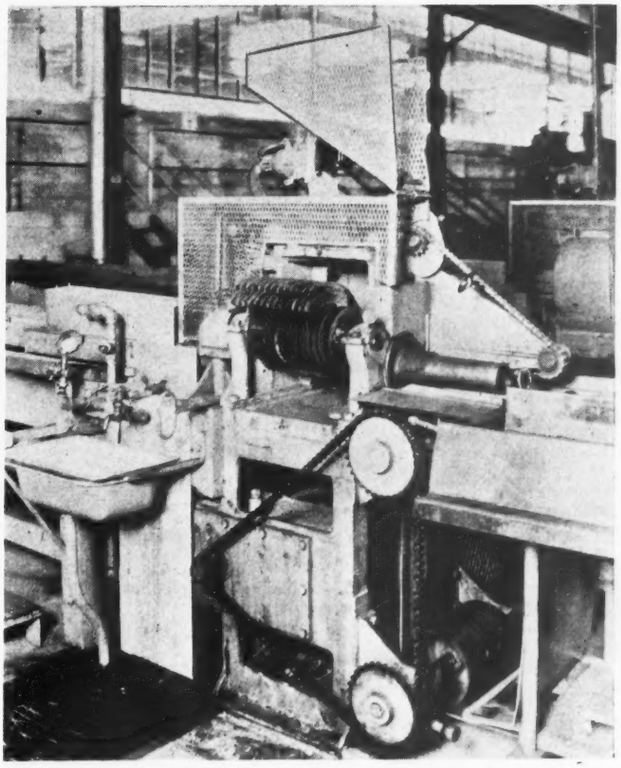
Trimming of fruit from Ginaca machines is completed by hand at tables like this

is cut to a diameter of $3\frac{3}{4}$ in., with a $1\frac{1}{4}$-in. core removed, for a No. $2\frac{1}{2}$ can. No. 2 is cut to a diameter of $3\frac{3}{16}$ in., with a $1\frac{1}{16}$-in. core removed, for No. 1 flat and No. 2 cans. No. 3 is cut to a diameter of $2\frac{3}{4}$ in. with a $\frac{7}{8}$-in. core removed, for No. 1 tall cans.

From the Ginaca the cylinders of fruit move to the trimming tables. In sizing the fruit and in removing the ends the Ginaca has left portions of shell at each extremity as well as occasional eyes, bruises, etc., on the sides of the fruit. The Ginaca could remove them, but with much waste of perfect fruit, hence the work is done by women with knives. Their hands are covered with rubber gloves as a sanitary measure and to protect them from bromelin, a proteolytic enzyme found in fresh pineapples, which attacks the skin.

After being trimmed, the fruits pass to machines to be cut into slices of varying thickness, depending on the size of the fruit and on the particular grade being packed. In passing through the slicing machines they are also washed with cold water. The slicing machine in use at the present time consists essentially of a tubular head provided with circumferential slots and a series of continuously rotating scythe-shaped knives that traverse the slots transversely during a part of the rotation to slice the fruit held stationary in it. The knives then clear the head during the remaining part of the rotation to permit the discharge of sliced fruit and the delivery of the next fruit to be sliced. The chain carrying the fruit in and out of the slicer operates with an intermittent motion, so that the fruit is stationary during the period the blades are passing through it. This machine was invented by Napier, Porter, and Silva, of the Hawaiian Pineapple Company, and was patented in 1924. Patents on the machine are owned by the Hawaiian Pineapple Company, which builds and sells the machines to other canners. There were several earlier slicers, but all of them have been superseded by the one just described.

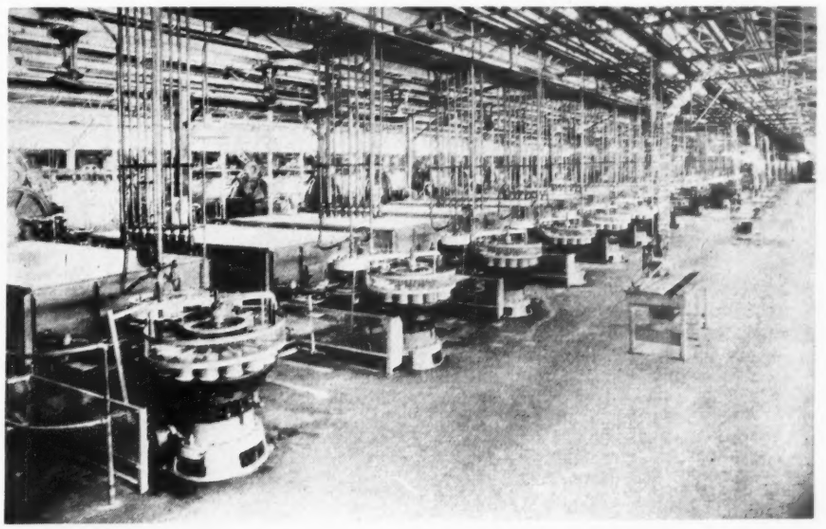
In these slicing machines the pineapple has been cut into the familiar

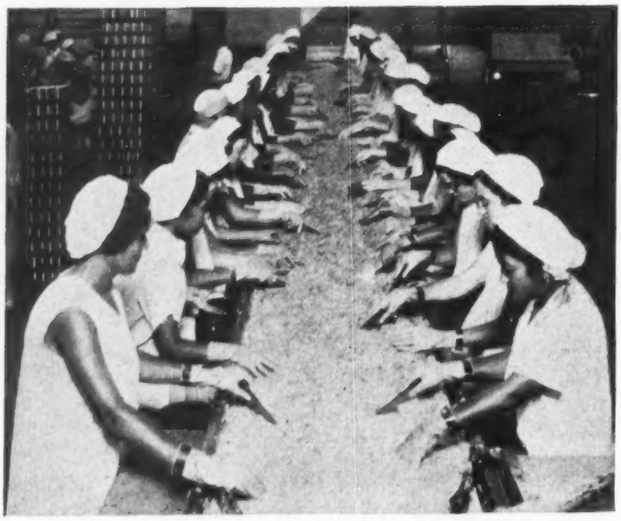


Napier-Porter-Silva slicing machines, opened, with scythe-shaped knives showing

disks of fruit with holes in the centers. The slices pass to the packing table, where women, wearing rubber gloves, sort the fruit and place it in cans. This hand operation probably will continue to be necessary. A photo-electric cell might be employed to grade the fruit as to color, but it is difficult to conceive of a machine that would reject broken and otherwise imperfect slices. Yet here is something for an aspiring inventor to work toward. The women who do this work have quick eyes and deft hands; as a rule each selects slices of only one grade as they pass before her, and the trays of filled cans mount rapidly. In general there are three grades: No. 1, or "Fancy,"—perfect yellow slices packed in a heavy syrup of pineapple juice and cane sugar; No. 2,

Lines of pre-vacuumizing machines, exhaust boxes, syruping machines, double steamers, and steam cookers





Removing fragments of shell from crushed pineapple prior to canning

or "Standard," is less uniform in color and shape and is packed in a thinner syrup; No. 3 consists of broken slices, packed in the same syrup as is used for No. 2. No. 1 slices and No. 2 slices also are cut into titbits, and there are also No. 1 and No. 2 grades of crushed, but there is no No. 3 crushed.

The filled cans are placed on wooden trays having only three sides, and taken by hand truck to the processing department. By tilting a tray a workman slides the cans onto a rotating metal disk, and centrifugal force carries the cans to the outer edge, where a guide bar steers them, one at a time, onto a short conveyor leading to the pre-vacuumizing machine. Here each can is subjected to a high vacuum, which, by withdrawing air from the tissues of the fruit, permits syrup to penetrate more rapidly, resulting in slices of a more uniform color and a pleasing translucency. This process is unique to pineapple packing, and even there is not employed by all canneries. It was devised and patented by H. W. Ginaca, inventor of the trimming and coring machine. The centrifugal feeder, described above, was patented by Martin E. Wilberts in 1922 and is used to some extent in other kinds of canning.

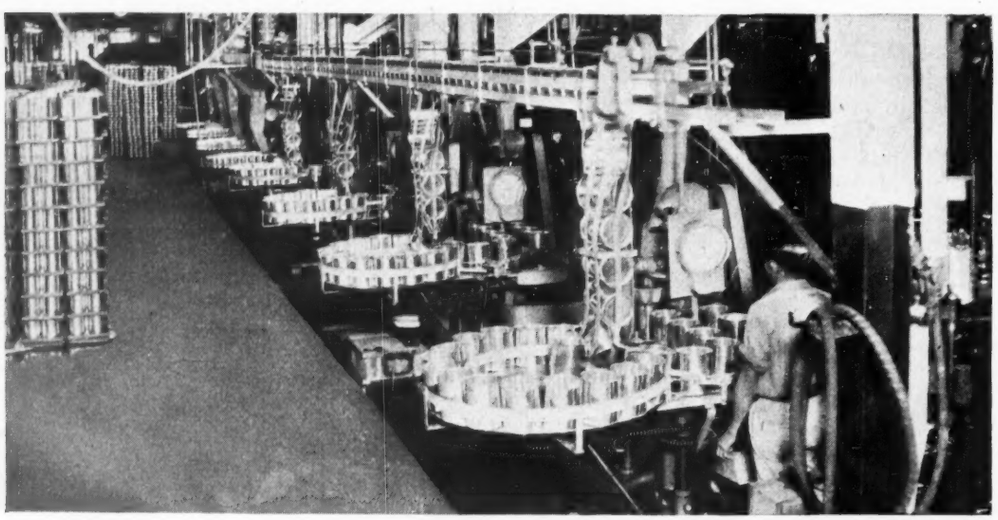
Syruping follows. The quantity of syrup added is such that the average concentration of sugar in the can after processing is 24 deg. Brix for the No. 1 grade and 20 deg. Brix for Nos. 2 and 3. The cans pass next into an exhaust box heated with steam, where they remain for five minutes while moving toward the closing machine.

In 1931 the Hawaiian Pineapple Company will seal all of its fruit except the crushed under an actual vacuum, without using the exhaust box. For this operation the engineers of the Hawaiian Pineapple Company, working with the engineers of the American Can Company, have adapted the No. 400 vacuum seaming machine of the American Can Company.

From the exhaust box the cans pass into a closing machine, then into a rotating pressure cooker. The temperature and time of cooking vary with the size of the can. From the pressure cooker the cans go into a vertical water-spray cooler, where their temperature is reduced to about 110 or 120 deg. From the cooler the cans move into a hopper and thence are released by a workman into a tray. As each tray is filled, a lever prepares it for engagement by a tray stacker; the tray is lifted and stacked on top of other trays to await removal by an electric lift truck which carries two stacks at a time to the cooling and inspection floor.

Throughout the whole process of canning the inspection has been rigid. There will be another inspection for leaks, dents, dirty cans, mismarked cans, before transfer to the warehouse and there will be final inspections, by opening cans of fruit, before the product is released for shipment.

Canning has been accomplished in about 24 minutes. In a series of exhaustive studies to determine the time of each operation, the Hawaiian Pineapple Company has found that 91 seconds is required for sizing in the Ginaca machine, hand trimming, slicing and placing the slices in the cans; 369 seconds for trucking, vacuumizing, syruping, exhausting, and closing the cans; 973 seconds for cooking and cooling—an aggregate of 1,433 seconds. The capacity of the Ginaca machines is 85 pineapples a minute for the larger sizes, and 110 pineapples a minute for the smaller. The capacity of the processing machines is 120 cans a minute, and an increasing number of processing lines is operating at 150 cans a minute. The labeling machines handle 525 cans a minute each. Hand work is at a minimum; for example, from the time of entering the feeding disk of the pre-vacuumizing machine to the time of entering the tray filler the cans are handled by machines without interruption and at a usual rate of 120 to 150 cans a minute each. Only three



Empty cans delivered by overhead conveyor are filled with crushed pineapple in these machines

men are needed for each line, one to feed the cans upon the disk that starts them into the pre-vacuumizing machine, one to watch the closing machine, and the third to operate the tray filler. In 1930 there were 26 canning tables in the Hawaiian Pineapple Company's plant fed by 30 Ginaca machines, 30 cooking lines, and eight labeling lines.

Little of the edible part of the pineapple is lost. The Ginaca machines remove as much of the pineapple adhering to the shells as possible, and this pulp, after moving on a wide belt before woman employees, who remove bits of shell that may be present, goes to kettles to be cooked as crushed pineapple. In the kettles additional crushed fruit, made up of imperfect slices which have gone through a shredding machine, is added and the whole is cooked by steam. The kettles are made of nickel or stainless steel equipped with agitators and automatic temperature-control instruments. In the plant of the Hawaiian Pineapple Company these kettles are on the second floor, so that the cooked pineapple will flow through pipes to automatic filling machines on the floor below, where No. 10 cans are filled at the rate of 50 to 60 a minute by each machine and smaller cans at the rate of 80 to 120 a minute. Without further cooking, the cans are closed, washed with sprays of hot water, cooled, and thereafter are handled in the usual manner.

Sliced, titbit, and crushed pineapple are three of the principal products of the Hawaiian Pineapple Company. The other is canned pineapple juice, thousands of cases of which are manufactured as a beverage. This juice is drained from Ginaca machines and from the crushed fruit.

Much juice is used in canning the fruit. It comes from various sources. Some escapes from the "eradicator meat" of the Ginaca, but most of the juice comes from shells, cores, and trimmings. In general, approximately one-half of the original weight of the pineapple goes into cans; the remaining half consists of shells, cores, trimmings, and ends. This so-called waste first goes through shredders which cut it into small bits and then it passes through continuous presses which extract as much of the juice as possible. The juice thus extracted contains about 11 per cent of fruit sugars and about 1 per cent of acid, principally citric acid. After going through a clarification and filtration process it is neutralized with milk of lime (in the Hawaiian Pineapple Company plant) or calcium carbonate, and the citric acid is precipitated as calcium citrate. It is necessary to remove most of this acid, because otherwise the syrup made from the juice would be too sour. After acid removal, cane sugar is added to the juice to make the syrup for canning fruit. About 6,000 tons of sugar is used annually. Syrup made thus from neutralized juice contains natural fruit sugars which improve the flavor and decrease the requirements for cane sugar. Between 30 and 40 per cent of the juice, after the citric acid has been precipitated, is used for syrups. The remainder is pumped to the plant of the California Packing Corporation, which manufactures alcohol from it and from the waste juices of its own plant. This alcohol is marketed principally as denatured alcohol. The carbon dioxide resulting is compressed for soda fountain use.

In 1930, the Hawaiian Pineapple Company began the erection of a plant for the manufacture of citric acid from calcium citrate. When this plant is completed the Hawaiian Pineapple Company will receive calcium citrate from the California Packing Corporation, in addition to that produced in its own plant.

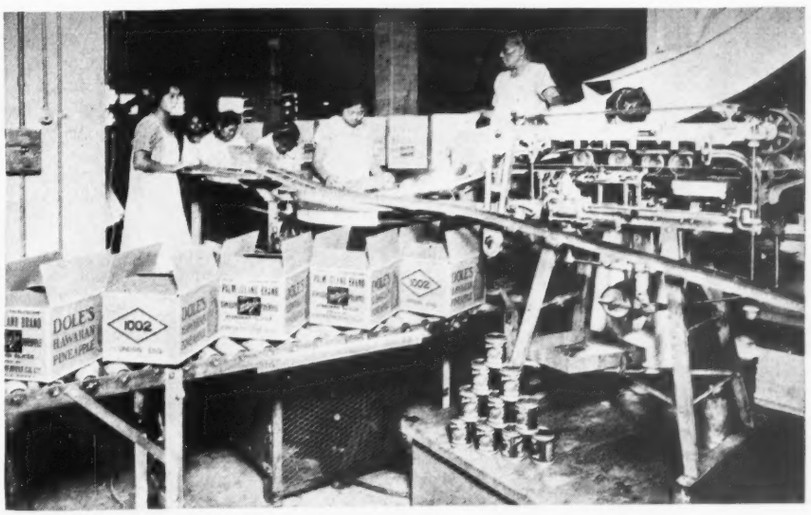
Sometimes the cores of the pineapples are candied, but usually they are pressed for their juice. The consequent waste, together with the shells, ends, and trimmings, after juice extraction, goes through long rotary heaters. The resultant material is known as "pineapple bran," a feed for cattle and hogs. Each ton of fresh fruit yields about 60 lb. of the dried bran and the 1930 output was between 4,000 and 5,000 tons.

At the peak of the season the Hawaiian Pineapple Company employs about 8,000 persons—4,200 in the cannery and sales office, and 3,800 on the plantations. About half of the plantation employees are permanent. The cannery employees are largely seasonal, the year-round cannery force being composed of 650 persons. On canning days in the off season about 1,450 persons in all are employed at the cannery.

In such a plant, counts are of great importance. It already has been said that each pineapple is counted automatically as it enters the Ginaca machine. Another device counts the carriers of the Ginaca and thus the efficiency in the operation of each Ginaca is measured, since the number of empty carriers is immediately apparent. There are counters at the can-marking station where cans are stamped, also counters at the closing machines and the cookers.

Probably the most interesting installation of counters is on the conveyors that take cans from the plant of the adjoining American Can Company to the plant of the Hawaiian Pineapple Company. No less than nineteen lines transport the cans; on each line there are three counters, jointly owned by the American Can Company and the Hawaiian Pineapple Company, all of which are read and set back to zero daily. Differences in readings are adjusted by representatives of the two companies. In addition, the Hawaiian Pineapple Company has a master counter on each line, which is not set back. In the rush season two million cans daily may pass along these conveyors. Inside its own plant the Hawaiian Pineapple Company now has four counters on each line.

Labeling cans of Hawaiian pineapple and packing cartons for shipment



Automatic Control of

ELECTRICAL PASTEURIZATION EQUIPMENT

By H. C. BRUNNER
General Engineer
Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

THE Electropure Sales Corporation, Pittsburgh, Pa., has adopted an automatic electrical control for its pasteurization process that automatically controls the temperature within 1 per cent of the ideal temperature reading of 162.5 deg. F. The Electropure process is an electrical conductivity pasteurizing process in which the pasteurization is accomplished by passing electric current through the milk. Heat is generated within the milk itself during the time that it is flowing between two carbon electrodes. The electrodes act as conductors in getting the electric current into the milk, whereupon the electrical resistance of the milk itself causes the generation of heat.

A 220-volt a.c. power supply is connected to the electrodes which form the opposite sides of a rectangular chamber through which the milk is pumped. For a 550-gal.-per-hour unit these electrodes are 32 in. long, 4 in. wide, and are spaced 3 in. apart. This unit consumes 48 kw. per hour.

The flow system can best be understood by reference to Fig. 1. The tank, *A*, is a small surge tank equipped with a float valve for maintaining a constant level supply from which to pump. The milk is drawn by suction from the bottom of this tank into the line, *B*, which conducts the milk to the tubular heat exchanger, *C*. In the heat exchanger, the raw milk reclaims heat from the hot pasteurized milk which flows down over the outside of the tubes. The raw milk flows back and forth through this heat exchanger in a counter-flow direction with respect to the hot pasteurized milk flow.

Still under suction, the milk leaves the heat exchanger, and is conducted by the line *D* to the milk circulating pump, *E*. This pump is of the positive acting rotary type construction. The milk leaves the pump by the line *F*, and enters the twin filter, *G*, where it is strained. Any air that may have entered the flow system is released at the top of the twin filters, and the warm milk, free from air, is conducted by line *H* to the bottom of the electrode chamber.

It passes upward through this chamber and is subjected to the action of the electric current. The temperature indicating and regulating bulb, *I*, is placed in the discharge header directly in contact with the hot milk. The pipe *J* conducts the milk to the spreader head, *K*, which distributes it in the form of a film that flows down over the heat reclaimer tubes and onto the brine-cooled tubes to be cooled to the bottling temperature. It drains into the collecting pan, *L*, and is discharged into the line *O*, leading to the bottle fillers.

This system of milk flow places the untreated milk

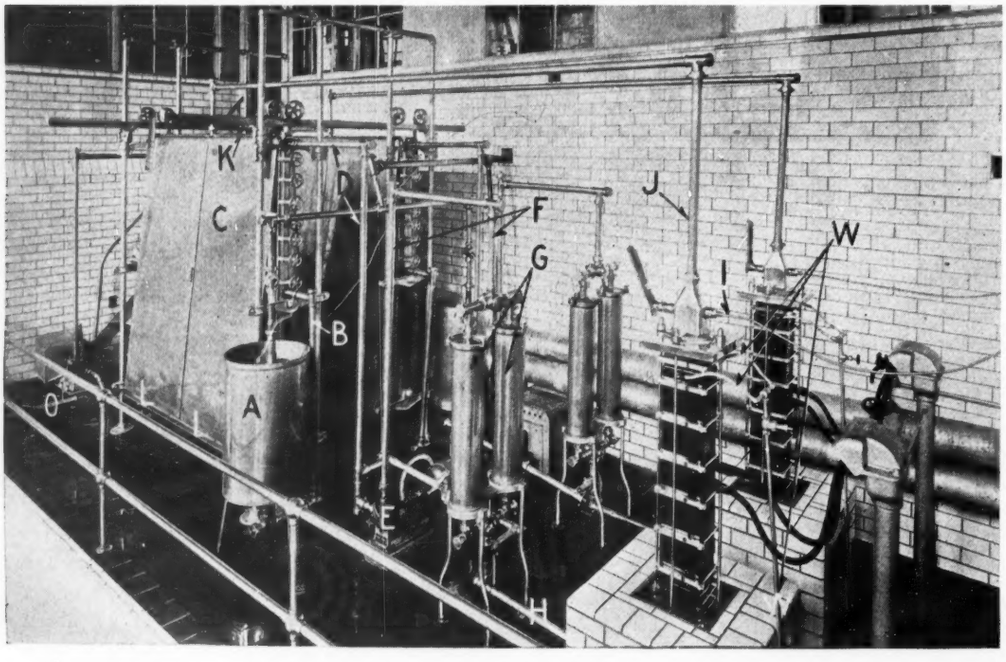


Fig. 1—This filling room mezzanine at the St. Lawrence Dairy Company, Reading, Pa., contains two 550-gal. per hour Electropure pasteurizing units

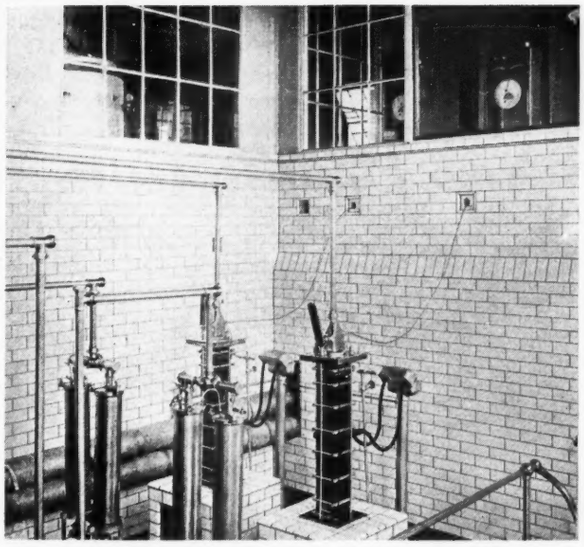


Fig. 2—The automatic electric control units can be located as desired. At St. Lawrence dairy they are in the laboratory

inside the heat reclaimer tubes under a suction while the treated milk flowing down over the outside of these tubes is at atmospheric pressure. This means that none of the untreated milk will leak into the treated milk.

The electrode cooling system also is shown in this photograph. Each electrode is cooled by a stream of water which is supplied by the water line, *W*. This cooling water flows in film form down the outside of the electrodes, completely cooling the surface. Cooling is required because the electrodes are in contact with hot milk and not because of any heat generated by passage of the current through the electrodes themselves.

The electrical resistance which the milk offers to the flow of the electric current causes the milk temperature to be quickly raised in the electrode chamber. If either this electrical resistance of the milk or the power supply voltage changes, the amount of heat generated within the chamber will change. In actual operation, both are continually varying, and some means must be provided for regulating the rate of milk flow accurately so as to compensate for these and maintain practically a constant temperature at the outlet of the chamber. In addition, it is necessary to compensate for changes in the temperature of the raw milk supply. The limits of the practical operating range are set at the low temperature limit by health codes and at the upper limit by the critical eye of the housewife. If the temperature drops too low, pasteurization will be incomplete, and if the temperature rises too high, the amount of cream showing in the top of the milk bottle will be decreased.

The supervised automatic control was developed to simplify the operation of the process, eliminate the possibility of human errors, secure an accuracy of temperature control which was not dependent upon the skill of the operator, and make constant attention by an attendant unnecessary. The chart shown in Fig. 3 is a representative one obtained with the supervised automatic electrical control and is indicative of the successful achievement of these aims.

By referring to the chart, Fig. 3, it can be seen that the apparatus is easy to start and simple to operate. The warming-up period, during which a dilute salt solution is used, consumed less than fifteen minutes. During the normal run, with milk passing through the system, the temperature varied a maximum of slightly over 1 per cent from the ideal temperature reading of 162.5 deg. F. The brief rise near the end of the run is due to the complete draining of the milk supply, which during the normal run is held at a constant level point. The rapid drop at the end of the run occurs when the follow-up fresh water reaches the electrode chamber. This occurs just after the last of the milk has left the electrode chamber, and causes the circulating pump to be automatically stopped at the instant that this temperature drops below 160 deg. F.

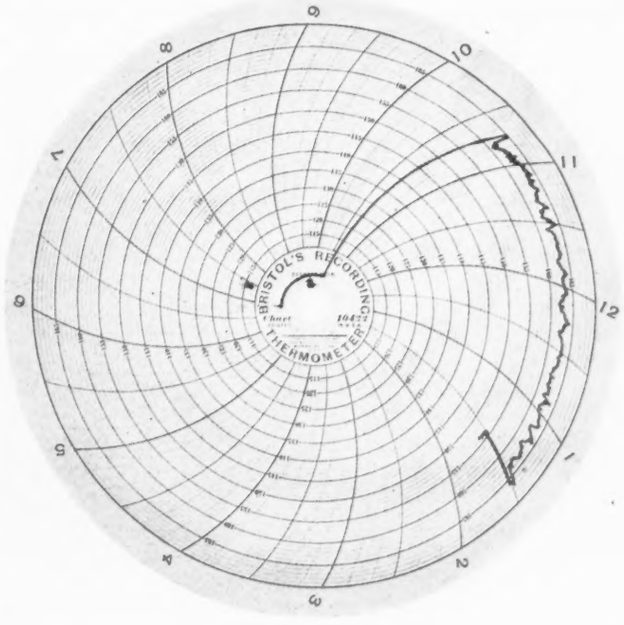
Even with this short run the operator was able to spend 80 per cent of his time attending to other duties, because the control is automatic and equipped with alarms to call the operator and lamps for indicating any necessary adjustments. Due to the fact that the control provides practically an infinite number of speeds between the maximum and minimum points, such adjustments are minor and are required only at infrequent intervals.

This change in the speed of the milk flow is accomplished by varying the speed of the milk circulating pump, which is a positive-acting rotary type of pump and is driven by a 220-volt a.c. repulsion motor. The speed of the motor is regulated by varying the voltage applied to the motor terminals, and one of the features of this automatic control is the incorporation of anti-hunt resistors into the circuit in series with a motor-operated rheostat.

By selecting the value of these anti-hunt resistors and the speed of the motor-operated rheostat in the proper relation to the speed of the temperature response of the flow system, it is possible to correct quickly for sudden changes in the line voltage and still prevent hunting of the rheostat when correcting for the gradual changes, such as the milk-resistance and milk-supply temperature changes.

Since the electrode chamber outlet temperature is automatically regulated by the control unit, the operator's function is merely to start the units and attend to some simple operations when the control gives an alarm and indicates the kind of adjustment that is required.

Fig. 3—Milk temperature chart, showing temperature at outlet of electrode chamber



SCIENCE VITALIZES

Cashew Nut Production

By THOMAS M. RECTOR
Research Engineer
Franklin Baker Company, Inc.,
Hoboken, N. J.

Heating the nuts until they catch fire, followed by rapid quenching, is necessary to permit removal of the shells

AS LATE as 1923, the cashew nut was known to importers as one of the most risky of all foods to import and distribute, and importations did not total more than 100,000 lb. per year. Since that time, however, the consumption of cashew nuts in the United States has practically doubled each year, and in 1930 the total consumption in this country was considerably more than 5,000,000 lb. The reason behind this revolutionary change is an outstanding example of the application of scientific preservation methods and strict quality control.

For many years, cashew kernels in the crude state, with the red skin still on them, had been imported into Europe as a substitute for filberts. This trade often reached large proportions when the filbert crop was a failure. In some years the importations through Marseilles are said to have been as much as 2,000,000 lb. In the period from 1900 to 1920, attempts were made to popularize crude cashew kernels with the bakers and confectioners of the United States, but these attempts failed due to spoilage from insect infestation and general dissatisfaction with the product because of its unsanitary appearance.

Immediately after the World War, attempts were made to import blanched cashew nuts by various methods, and while occasionally small lots of nuts of fair quality were brought in without insect infestation, the risk soon became so great that importations fell off to nominal quantities. Strict inspection by the U. S. Department of Agriculture further increased the difficulties of importation, and for a time about half the shipments received in New York were condemned as unfit for food purposes.

From 1920 to 1923, the commercial method of packing food products in inert gases known as the "Vitapack" process was perfected by Franklin Baker Company. This method as finally applied to cashew nuts, consists essentially in removing the air from a flexible walled metal container filled with the nuts, and replacing the air with a suitable gas, usually carbon dioxide, partly soluble in the oil of the nuts. Laboratory experiments indicated that this method of packing would solve the problem of importing cashew nuts without the usual danger of insect infestation. These experiments developed in 1923 into test shipments of cashews packed in India by a Franklin Baker Company chemist. The test shipments were well received by nut salters and the public generally, and shipments have continued in ever increasing amounts from month to month.

Having solved the problem of preventing the onslaughts of the Indian meal moth and the saw-toothed grain beetle, it became necessary to improve the methods of preparation and grading of the nuts so that they would be acceptable to the trade and the ultimate consumer. This meant that the cashew nut had to be studied

To native workers, this amazing posture is perfectly comfortable

from the tree to the export package. As much information as possible was collected about the quality and quantity of nuts available in the districts where the nuts were grown commercially, and shelling plants were located accordingly. Studies were made of the native methods of shelling and blanching, and methods evolved for improving the finished product in color and uniformity.

The cashew nut tree in India grows to about the size and shape of citrus fruit trees in this country, but because of lack of attention and volunteer growth, is inclined to be gnarly and misshaped. The tree starts bearing in its third or fourth year, but does not bear in quantity for about eight years.

The nuts grow in a peculiar fashion, attached to the blossom end of a fruit about the size of a large quince. The fruit is in reality the stem of the nut, which swells rapidly near maturity, and becomes filled with a large quantity of sweet, astringent juice. The fruit is very delicate and is either eaten locally or fermented and distilled into a potent brandy-like spirit.

The cashew kernel is inclosed in a shell which also is peculiar in structure. The outer skin is bluish gray in color, and quite tough. The inner shell is more brittle, but very hard. Between the outer and inner shells is a honeycomb of cells containing a liquid resinous material. This liquid apparently is a natural protection against the ravages of insects and fungi.

When the shell of the cashew nut is removed, the kernel proper is found to be covered with a reddish brown skin resembling the skin of almonds but somewhat thicker. This skin must be removed to produce the blanched cashew kernel of commerce.

The kernel itself is comma shaped, and weighs from one to two grams. Its chemical composition with respect to fat, protein, and carbohydrate content is similar to that of the almond. The sweet, golden yellow oil, which is present in the kernel in the amount of about 50 per cent, is almost identical with olive oil in chemical constants, and would make a wonderful salad oil if available in quantity.

The methods now used for shelling cashew nuts are quite distinctive and correspondingly interesting. It is impossible to shell cashew nuts without breaking the kernel unless they are given a preliminary treatment. This treatment consists in heating the nuts in shallow pans until they swell and eject the resinous liquid in the shell. The heating is continued until the nuts actually catch fire. The fire is quenched with water, and the nuts are thrown on the ground quickly to cool. The entire operation is done so rapidly that the kernel does not have time to become scorched. After cooling, the shell becomes brittle, and can be cracked by hand without breaking more than 20 per cent of the kernels.

The kernels are dried in tray dryers to facilitate re-

Modern manufacturing methods have not entirely displaced this picturesque conveying equipment

Grading the nuts for size and color. The screening prevents depredation by crows

moval of the red skin. This also is a hand operation which requires quite a lot of manual skill to prevent excessive breakage. After removal of the skin, or "blanching," the kernels are graded for size and color and packed in standard 5-gal. square tins. These tins hold 25 lb. of blanched kernels. After the Vitapack treatment, done by machinery supplied from United States, the tins are sealed and packed, two to a wooden case, ready for shipment. Because of the lack of manufacturing skill among native workers and their foremen, quality supervision must be severe, and two American superintendent inspectors are maintained in India at all times for this purpose.

The cashew nut is most widely used as a salted nut. The process of roasting and salting involves cooking in refined coconut oil at temperatures of from 275 deg. to 300 deg. F. for about seven minutes, and the addition of about 3 per cent of fine salt, and requires little equipment or experience. Consequently, the salting of the nuts has added a very profitable item to the list of many bakers, confectioners, and peanut and potato chip firms.

Two 25-lb. tins go into wooden boxes. Native vessels take them to the seaport

Confectioners have found the broken grades of cashew nuts to be exceedingly useful as substitutes for the more expensive nuts, and many have coated special cashew confections which enjoy increasing sale.

The most important byproduct of the cashew nut is the resinous oil from the shell. Cashew shell oil has the remarkably high iodine value of 265 to 300, and reacts with formaldehyde to form solid synthetic resins having superior dielectric properties. The future of this development is so promising that many are inclined to think that eventually the shell oil will be the principal product of the cashew tree, and the kernel the byproduct. Another byproduct of the cashew tree is a gum which exudes from the bark. This product resembles gum arabic and tragacanth, and may eventually be of commercial value.

Looking a little into the future of the industry, the rapidly increasing demand makes it seem likely that the cashew nut is destined to be an increasingly important food product which may soon outrank in volume many of the better known quality nutmeats.

▼ ▼ ▼

Tomato and Beet Packs Increased

THE total pack of canned tomatoes in the United States in the past year was but a few hundred less than seventeen million cases (based on 24 No. 3 cans), according to figures collected by the Bureau of Foreign and Domestic Commerce. This is almost three million more than the 1929 pack, and has been exceeded only in 1925.

Imports of canned tomatoes were cut to less than half the 1929 figures last year, totaling 61,846,445 lb., in comparison to imports of practically 175,000,000 lb. in 1929.

Production by states and sizes of containers for the last two years is shown in the tables below:

Canned Tomato Pack

(Basis 24—No. 3 Cans)

States	1929	1930
Maryland	4,050,160	3,769,564
California	2,811,550	3,460,162
Indiana	1,134,181	2,028,943
Missouri	621,613	*1,120,016
Arkansas	768,643	†1,050,177
Virginia	918,475	818,494
Utah	767,633	788.309
Delaware	851,238	754,864
Tennessee	297,114	518,327
New York	328,957	466,681
Ohio	153,343	428,976
New Jersey	256,523	355,598
Colorado	195,454	292,553
Illinois	184,384	222,971
Kentucky	166,770	161,108
Pennsylvania	171,953	150,680
Iowa	95,273	113,781
Michigan	‡	110,898
All other states	422,237	385,697
Total	14,145,301	16,997,799

*Collected by Ozark Packing Corporation; includes 41,870 cases packed in Oklahoma.
†Collected by Ozark Packing Corporation.
‡Included in "All other states"

Total pack in the United States for the past ten years and corresponding imports, as compiled by the Canners' League of California, are as follows:

Year	Domestic Production (24 No. 3 Cans)	Imports, (Pounds)
1930	16,997,799	61,846,445
1929	14,145,301	174,786,822
1928	8,538,582	93,646,672
1927	13,137,042	93,771,966
1926	9,455,000	84,749,219
1925	19,770,000	86,237,642
1924	12,519,000	55,816,661
1923	14,672,000	33,797,311
1922	11,538,000	.....
1921	4,017,000	.....

The canned beet pack in 1930, as recently announced by the National Canners Association, is also considerably higher than 1929 figures. Based on cases of No. 2 cans, the production by states is as follows:

	1929 Cases	1930 Cases
California	45,372	61,512
Colorado	29,660	141,412
Indiana	34,644	64,738
Maryland	41,684	114,172
Michigan	79,763	91,159
New Jersey	170,956	225,870
New York	543,861	677,262
Ohio	32,394	20,614
Oklahoma	26,360	(a)
Oregon	132,986	146,249
Tennessee	42,691	77,920
Utah	22,897	58,286
Washington	85,329	99,278
Wisconsin	709,450	1,096,880
All other states	15,057	47,711
Total	2,004,104	2,923,063

(a) Included in "All other states."

HOMOGENIZED MILK

Finds Favor in Canada

By MARC H. HUDON
Laurentian Dairy, Ltd.
Ottawa, Ont.

CANADA has the distinction of being the pioneer in the application of the homogenization principle to the market milk trade, commercial application of the principle having been in use there for a number of years. In fact, the homogenization of pasteurized milk has become so essential a factor in maintaining milk sales in many parts of the Dominion that in a number of instances the dairy enterprise, from the net profit standpoint, could not be maintained without its aid.

The first companies to experiment with market milk homogenization in Canada met with serious difficulties and disastrous results. Those who followed realized that in order to obtain success, it was first necessary to have their entire organization convinced of the fact that it was a better product than ordinary milk.

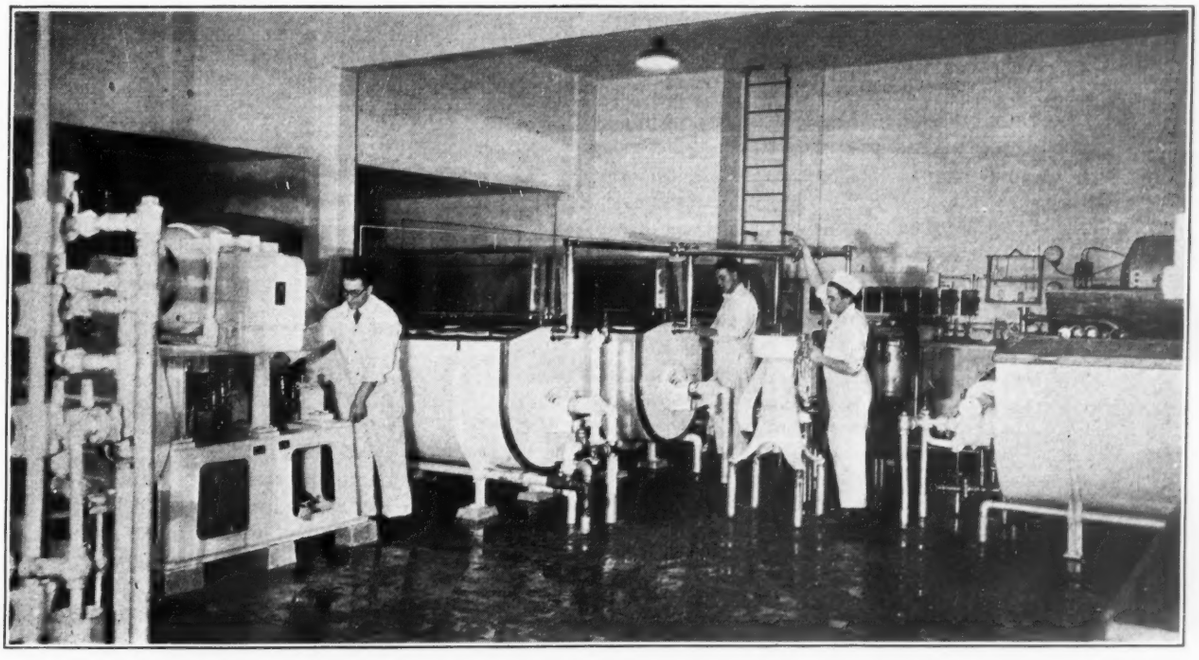
Some dairy companies went to the trouble of homogenizing cream and mixing it with milk of a relatively low fat test, to enhance the cream line. Fortunately, this procedure is condemnable by law and therefore finds but little favor with milk distributors. This practice defeats the purpose of homogenization and renders the word a misnomer. It really fosters the common practice of using the top part of the ordinary bottle of milk for coffee or cereals, thereby leaving the remaining portion not much better than skim-milk.

The homogenization principle, when applied to the pasteurized milk trade, comes boldly forward with the meritorious claim that "blue milk" is a thing of the past. It is here that homogenized milk, in the full sense of the word, finds the greatest argument in its favor.

The successful commercial introduction of homogenized milk came into being only in the early part of 1927. A dairy about to start in business recognized homogenized milk as a product capable of withstanding keen competition. In view of the fact that it is quite a task to turn the buying habits of the consuming public, sales resistance had to be expected and dealt with by judicious advertising coupled with a quality product. Using advertising as a booster soon proved that the homogenization of milk was feasible in a commercial way. The success of this dairy aroused the interest of its competitors and most of them also adopted this treatment of milk.

The result is that in the city of Ottawa, the capital of Canada, the four main milk distributors, handling 95 per cent of the total milk sold, now offer their customers pasteurized homogenized milk as well as regular pasteurized milk. At the present time, homogenized milk is mainly a product of the provinces of Ontario, Quebec, and British Columbia, although we find scattered individual dealers all over the country endeavoring to popularize the product. There are about nine milk distributors in Ontario, at least one in Quebec, two or three in the Western provinces, and one or more in British Columbia,

Milk processing room, showing homogenizer at the left



homogenizing the greater part of their milk supply for street sales.

In a general way the Canadian milk distributor, on adopting milk homogenization, sought full indorsement of the health boards. Although certain boards of health have been antagonistic to the homogenized milk trade, on the whole, the co-operation given by the health authorities has been commendable.

It has been asserted that the fat standards apparently were not observed by the dealers. In a few isolated cases this has led to disagreements between dealers and health laboratories. The fact remains that to a great extent the argument has no practical value. Dealers have come to realize that a 3.6 per cent butter-fat pasteurized milk will not yield a 3.6 per cent butter-fat homogenized milk by actual Babcock fat test. The reason for the discrepancy arises from the fact that the fat globules are so finely divided that some of them cannot be raised with the fat column in the Babcock test bottle under ordinary testing practice. Again, one must remember that under usual conditions with ordinary milk, as much as 0.1 per cent fat remains unseparated in the neck of the Babcock bottle. With homogenized milk this amount may be increased to as much as 0.2 or 0.3 per cent Obviously, this does not mean that the butter fat is not in the milk, but that the fine state of division of the fat globules, with curd particles adhering to the fat, have a tendency to increase the quantity of unseparated fat. Were the fat testing done according to one of a number of ether extraction methods, the unjust criticism of actual lack of richness in fat would soon be overcome.

Certain boards of health have been averse to homogenized milk for the reason that the bacterial count was expected to be so great as to be a menace to the public health. Theoretically, a process requiring additional machinery or equipment is a source of increased bacterial contamination. In practice, however, this is debatable. The conscientious operator understood that he had a task ahead of him, realizing that the homogenizer is one of the most difficult pieces of dairy equipment to keep in a sterile condition. The recognition of the shortcomings of ordinary heat sterilization resulted in many attempts to find a superior method of bacterial control. The operator finally had recourse to chemical sterilization, making use of the chlorine compounds with a standard daily operating routine. Some, of course, met disaster, but those who gave the matter the careful attention it deserved achieved success.

A fact not commonly known, but of significant importance, is that homogenization permits a more efficient heat-treatment of milk. Since the cream line limits the heat-treatment to within a few degrees, greater pasteurization efficiency has been obtained wherever the homogenization of milk has been adopted. The fallacy of the cream line has made the distributor cater to the whims and fancies of his customers without his knowing it. If cast aside, it would certainly make for a high quality milk supply from the bacteriological standpoint.

RICH
---to the Last Drop!
"WHEN the consuming public is assured of the fat being present in the milk," writes Professor H. H. Dean, of the Ontario Agricultural College at Guelph, "they will call for this scientifically homogenized milk because of its greater food value—especially for children."
Laurentian Dairy, the first in America to eliminate the cream line by an even distribution of butter fat content in every bottle, offers Canadian mothers the finest bone and body builder that nature can produce. For Laurentian is giving them in every bottle, milk from clean, healthy cows; milk as rich and pure as when it first foams into the pail.
Laurentian
"Special Milk
From Laurentian Dairy Limited
IT COSTS NO MORE
PHONE RIDEAU 7000

Uniformity of milk in relation to child nutrition was a strong merchandising point

It is not amiss at this time to present a board of health bacterial count record (see table) of one year's duration of a milk distributor specializing in homogenized milk, but also marketing regular pasteurized milk, and compare the two products.

Bacterial Count Records

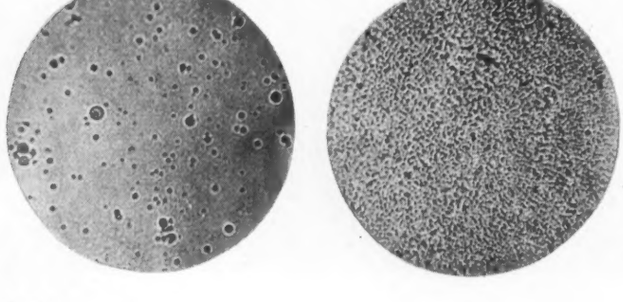
	Regular Pasteurized				Pasteurized Homogenized			
	No. of Samples	Min.* Count	Max.* Count	Average* Count	No. of Samples	Min.* Count	Max.* Count	Average* Count
Jan....	8	3,400	39,000	15,280	7	3,200	53,000	14,950
Feb....	5	9,000	40,000	21,400	7	2,000	11,000	5,570
March.	12	2,000	58,000	21,170	12	2,000	54,000	13,000
April...	10	7,300	60,000	32,430	10	6,000	80,000	27,100
May...	11	2,000	27,000	10,800	14	700	40,000	10,370
June...	8	3,000	28,000	15,600	11	2,600	90,000	27,860
July...	5	6,000	20,000	14,200	8	24,000	116,000	51,200
Aug...	8	12,080	80,000	27,370	9	6,000	90,000	18,940
Sept ..	8	6,000	48,000	19,320	12	2,000	25,000	11,000
Oct....	7	2,000	16,000	6,380	11	1,000	19,000	5,360
Nov. ..	8	1,000	36,000	10,870	11	2,000	15,000	5,400
Dec....	8	2,400	130,000	24,100	7	1,000	14,000	5,350
Total..	98				119			

* Standard Plate Count.

The record was kept for one year (1929) and represents the official counts on samples of milk collected from the delivery wagons by the local board of health. During ten months of the year, the homogenized milk had lower bacterial counts than the regular pasteurized milk.

It was mentioned above that the dairy in question specialized in homogenized milk, but further explanation probably is needed. For 100 qt. of milk sold, 86 qt. was

Photomicrographs of (left) pasteurized, and (right) homogenized milk



homogenized and 14 qt. was regular pasteurized milk, a ratio of about 6 to 1. The milk was held in the same pasteurizing vats and the pasteurization period was of 30 minutes' duration at 145 deg. F. for the ordinary milk, and 20 minutes at 150 deg. F. for the homogenized milk.

In the province of Ontario, where homogenized milk is meeting with the greatest success, pasteurization is defined, by the Milk Act 1, Geo. V. c. 69, s. 2, as follows:

> The word pasteurized shall not be applied to any milk unless all portions of it have been subjected for at least twenty and not more than thirty minutes to a temperature of not less than 140 and not more than 150 deg. Fahrenheit.

This allows, therefore, pasteurizing at 150 deg. F. for 30 minutes and suggests the idea that if the boards of health were to require the pasteurization of milk at 150 deg. F. for 25 to 30 minutes as standard procedure, improvement of the milk supplies from the bacterial standpoint would result.

We have mentioned that some health authorities were averse to homogenized milk, but there are other health boards that are loud in their praise for this product. One, particularly, claims that since this processed milk was offered to the public, complaints from restaurants and hospitals concerning the richness, appearance, and palatability of milk have been negligible.

The factors responsible for the increase in sales of homogenized milk in the Dominion can be reduced to three:

1. The benefits derived from the consumption of this milk.
2. The quality product that has been offered the public.
3. Proper advertising.

Let us briefly mention the merchandising points available to those who have entered this venture. The importance of assuring for every member of the family, especially the children, the precious milk fat and the vitamins associated with it cannot be stressed too much. Homogenized milk, it can truthfully be said, is rich to the last drop, and uniform richness makes for greater palatability.

The appearance of the milk at once suggests a pleasing taste. Due to the fine division and dispersion of the fat globules, it is uniform in color, with no "water-like" serum topped by cream.

It is difficult to determine if homogenized milk is easier to digest, as little research has been done along this line. However, the consensus of those in the trade appears to be in favor of greater digestibility. This is based on the fact that the finer division and dispersion of the fat globules render their digestibility easier.

It is likely that the constantly increasing business enjoyed by homogenized milk is due largely to the publicity sponsored by individual milk distributing companies. Some milk dealers handling ordinary raw or pasteurized milk spend the greater part of their advertising budget telling about the cream line; others stress it a good deal; yet others do not say so much about it, but work just as hard to maintain the full cream line in each bottle of milk. With homogenized milk, the consuming public has been kept acquainted instead with the superior value and the high sanitary standards under which it is processed.

Incidentally, one leading company specializing in "milk of uniform fat content from top to bottom," has pioneered radio broadcasting as an advertising medium for its product. One-half hour weekly is used to make known the quality and value of homogenized milk. Such good results were obtained through this medium that the bulk of its 1931 advertising appropriation is set aside for radio broadcasting.

Homogenized milk has been offered the Canadian customer, as far as can be ascertained, for the same price as regular pasteurized milk. Competitive conditions undoubtedly forced the distributors to meet the "milk with the cream line" on the same battleground.

In many cases, homogenized milk was given a coined name before it was offered to the consumers. This was done to mask the word "homogenized" with something simpler and with greater merchandising appeal. It also avoided undesirable recollections on the part of the public of the shortcomings of those milk companies that first experimented with homogenization.

There is no doubt that the homogenization of milk has increased the per capita consumption of milk and milk products in the localities where it has been featured. Where heretofore a quart of milk, part of which was used as cream in coffee or on cereals, and the remaining portion used as beverage or for cooking, sufficed a family, today the route salesman leaves a quart of homogenized milk and a half-pint of cream.

An explanatory message delivered with the milk bottle in this way is almost sure to receive attention

SPECIAL
"HOMOGENIZED MILK"
WHAT IT IS
LAITERIE LAURENTIAN DAIRY
MILK
IF you swallow a piece of candy whole, the taste is but slight. If you masticate it, you get the full flavour.
The same applies to our "Homogenized" milk. The fat globules, which in ordinary milk come to the surface in the form of cream, are broken up in small particles and distributed uniformly through the milk, giving it a pronounced and richer flavour than ordinary milk.
If you want the "Special Milk," tell our driver. It is the same price as the regular milk.
Laurentian Dairy Limited
Telephone RIDEAU 7000

Form 1 INTERNATIONAL STANDARD TRUCK COST SYSTEM. TRUCK OWNERS CONFERENCE, INC., CHICAGO

DAILY RECORD, MONTH OF_____ HOURS IN WORKING DAY_____ FROM_____ TO_____ TRUCK NO._____

OPERATING DATA																COST DATA (Posted to Form 3c)															
Date	Weather	Temperature	Number of Trips	Delivery or Pick-up Stops	Total Units (See D) Out	Total Units (See D) In	Miles	Time in Hours and Minutes: Available but not Used Hrs.	Available but not Used Min.	Loading Hrs.	Loading Min.	Running Includ. Stops Hrs.	Running Includ. Stops Min.	Laid up for Repairs Hrs.	Laid up for Repairs Min.	Gasoline or Current Gals. or K. W. H.	Gasoline or Current Cost	Cylinder Oil Quarts	Cylinder Oil Cost	Driver Cost	Helper Cost	Cost of Repairs: Ordinary Material Chassis	Ordinary Labor Chassis	Ordinary Labor and Material Body	Accident Body and Chassis	Substitute Vehicle Rental
1																										
2																										
3																										
30																										
31																										
Total																										

Truck Owners' Conference, Inc.

ADEQUATE ACCOUNTING

Dispels Trucking-Cost Confusion

By F. E. SPOONER
Maplewood, N. J.

THE simplest cost system for truck delivery should enable a fleet owner to determine the following points, if the data are properly interpreted:

1. What routes are profitable.
2. Which drivers are producing best.
3. What truck types are best suited for the work involved.
4. When is it cheaper to ship by truck than by freight, and vice versa.
5. Cost of repairs, gasoline, and oil consumption.
6. When is it cheaper to rent outside trucks.
7. Amount of time wasted in loading, unloading, on the route, and during the return to the garage.
8. When vehicles need repairs and adjustments.
9. Cost per dollar's worth of sales.
10. Cost per unit of merchandise.

A system comprising only two forms, and requiring but a few minutes a day per truck to keep going, is all that is needed. The first form is the driver's daily report, on which is noted those items needed to give a true picture of trucking conditions. Among the items usually included are the following: the truck number, date, time truck arrives at platform, time of departure, time of arrival at each stop, time on return to headquarters, number of trips, amount of goods carried and delivered or collected at each stop, weight of load, total mileage, fuel and oil consumption, driver and helper names, and number of hours worked by each. In addition, some truck owners use a part of the driver report to record roadside troubles, greasing, tire inflation, and repairs.

The foregoing data are totaled and recorded on the second form, which is a summary, usually one for each truck, in which the fixed charges and variable charges are noted. Charges for repairs, gasoline, oil, tires, and the like are also kept on separate sheets for the sake of quick reference in tracing the performance of any one truck, and for aiding in the selection of a new truck when replacement is necessary.

Fixed charges may be divided into administrative and operative. Each item in the following list is equally applicable to the large and the small truck operator:

ADMINISTRATIVE

Salaries for management and clerical assistance.
Office space.
Furniture and fixtures.
Telephone and telegraph.
Stationery and postage.
Heat, light and water for office.

OPERATIVE

Interest on investment.
Drivers' and helpers' wages.
Depreciation.
Insurance:
  Fire and theft.
  Liability.
  Collision.
  Employers' liability.
  Cargo.
Taxes.
License fees.
  Trucks.
  Drivers.
Garage and storage facilities.

Fixed costs are those which accrue over a period of time, whether the truck is operated continuously or not. For that reason, they are figures by the year, month, week, or day. Operating or variable costs, however, apply only when the truck is operated and, therefore, have a more direct relation to mileage than to time. The charges included under this heading are:

Fuel.
Lubrication.
Tires.
Repairs and maintenance.

The latter group of expenses is affected by a number of factors: the type of operation, kind of road, load carried, tires used, degree of traffic congestion, number of stops per mile, repair methods, driver skill and wage, climatic conditions, and average daily mileage.

Sooner or later every owner of a motor truck must determine how he can best charge off the investment. If he attempts to reach the solution from the experience of other owners, he finds a wide difference of opinion,

not only as to the proper period over which to spread the charge but as to the best method of applying the charge. Some favor the mileage basis, varying from 100,000 to 250,000, while others use the annual percentage basis, ranging from 3- to 10-year periods.

Depreciation, of course, is merely a bookkeeping device set up to restore the purchase price to the account from which it was taken. Before any method of depreciation can be applied properly, it is necessary to determine the true economic life—the period, usually expressed in terms of time, during which the truck can be operated with economy, as compared with buying and operating a new vehicle—so that the costs may be applied to those periods of time in which they accrue.

Every truck has to be replaced either because of wearing out or because of obsolescence. Economic life, therefore, relates both to mileage, which causes wear, and to time, which causes obsolescence. Thus, any method of depreciation must take into consideration both factors of time and mileage.

Truck owners who advocate a fixed annual percentage method of depreciation per year point out that motor equipment is still in the stage of rapid development, and that this method affords the better protection against obsolescence.

To this plan there would be little objection if all makes of trucks were of the same quality and operated under precisely the same conditions. As this is not so, use of this arbitrary fixed percentage is unsound. Although charging off depreciation on the mileage basis may require greater effort to apply, the fact remains that the variables in average mileage and operating conditions can be expressed better and more accurately determined on the mileage basis. Moreover, the mileage method allows a lighter charge for depreciation during dull periods and a proportionately high charge during active periods, when the vehicle is bringing in large returns.

The question of depreciation leads to a point that is frequently overlooked: namely, the difference between general accounting and cost keeping. For the general accounts, tax purposes, and the like, it may be desirable for an operator to set up some arbitrary method that will write the truck off the books somewhat before the truck actually becomes of no capital value.

Where an arbitrary annual rate of depreciation is to be used for the reduction of truck investment on the general books, a second, accurately estimated rate, either for the year or by the mile, and based on probable economic life, must be used for cost-keeping purposes.

Another question answered by accurate cost accounting concerns the economical distance for motor truck hauls. A summary of the cost of delivery per gallon by an ice cream company, for example, revealed an average of 35c. per gallon on ten of the eleven routes running from 32 to 110 miles per day. Cost per gallon on the 110-mile route was found to be 76c., well over double the cost of the average of the ten considered. In this case, one of several things must be done: either discontinue the route, increase the business, or arrange to ship the merchandise by express, provided the rate is low enough to make it worth while.

Route consolidation is quite often suggested from studies of vehicle performance as revealed in cost analysis. Idle time is the point to be considered in such a case. When trucks are idle because of needed repairs or because there is not enough work to keep them busy the whole day, thought must be given fixed charges. Thousands of dollars has been spent in route studies by the larger concerns to effect route consolidation through the use of speedier and more economically operated vehicles. In such studies, recognition was given to every possible cost factor as well as to traffic studies on the routes. It is patent that without a basis for cost comparison with one type of vehicle as against another, such a study would be hampered greatly. The substitution of a speedier vehicle for a slower type in use undoubtedly would make route consolidation possible, but without adequate basic cost figures, the economy of such a step must always be open to question.

Similarly, true costs can be put into play to visualize other hidden losses in operating expenditures. For example, gasoline consumption per vehicle is a good source for information. If figured on a mileage basis, as it should be, it will determine, for example, whether the engine is in need of an overhaul, whether the driver is inefficient, whether the truck is overloaded or underpowered, and whether the grade of gasoline used should be improved. A sudden drop in the miles per gallon should immediately arouse suspicion. In the same manner, tire, oil, grease, and repair costs stand as tell-tale information that will indicate need for checking.

Many executives have found that by breaking their costs down to a repair cost per mile per vehicle, they have over a span of years or the natural life of the vehicles been afforded an excellent graphic study upon which to base their future vehicle selection. And where route conditions are uniform and the load requirements about the same, then an additional economy is afforded in vehicle selection; namely, a standardized fleet. This should be the ultimate goal of every operator, because it affords economies in the repair shop by minimizing spare parts on hand, better trained shop personnel, and drivers who are familiar with the driving peculiarities of the make of truck used.

Truck Owners' Conference, Inc.

PRESENT BOOK VALUE_____ FORM 3C MONTHLY ANALYSIS OF COST

** Month	Total Fuel Cost	Cylinder Oil Cost	Drivers & Helpers Wages	Repair Due To Accident Actual	Sinking Fund (Mileage Basis)	Estimated or Budget: Maintenance and Repair	Battery Renewals and Maintenance	Tire Cost	Variable Monthly Expense	Fixed Monthly Expense	Total Monthly Expense	Actual: Maintenance and Repair	Battery Renewals and Maintenance	Tire Cost	Variable Monthly Expense	Fixed Monthly Expense	Total Monthly Expense
Total																	
Average																	

** Month Column can be filled in according to limits of fiscal year. Use first space for first month, etc.

Total Cost to be Depreciated $_____ For Est. Life of_____ Miles=_____ Per Mile

Estimated Yearly Maintenance & Repair $_____ For_____ Miles=_____ Per Mile

Tire Estimate Per Mile { Actual Life by Past Experience_____ Miles / Guaranteed Life_____ Miles } _____ Per Mile

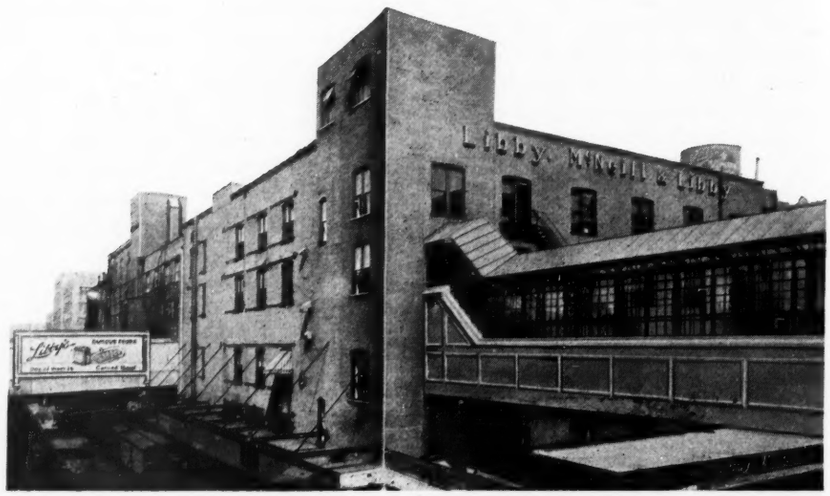
Battery Renewal Estimate Per K.W.H. Consumed_____

WHAT IS BACK OF THE LIBBY LABEL

From an Interview With

E. G. McDOUGALL
President, Libby, McNeill & Libby
Chicago, Ill.

By O. Fred Rost



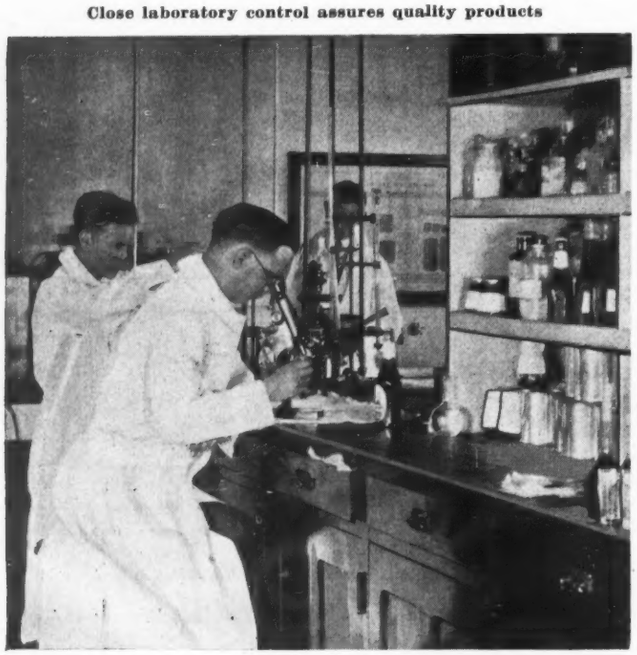
Meat packing plant in the Chicago stockyards district

HE STARTED as a bookkeeper. Thirteen years later he was sales manager. And 21 years after he entered the firm as a bookkeeper he became president. This in brief is the history of E. G. McDougall, president of Libby, McNeill & Libby.

If any one person is able to interpret the flying bull's head on a package of Libby's corned beef and the blue triangle label of its 100 famous foods or to distinguish the generic term of "quality" as it applies to Libby products, it is Mr. McDougall.

As a bookkeeper, he had his fingers constantly on the growing pulse of the firm while it was yet a meat-packing business; and later as sales manager and president he watched its expansion into other food products fields until it became, as it is today, a concern manufacturing the longest line of food products packed under one label in the world.

Close laboratory control assures quality products



Mr. McDougall smiled at the quotation: "The sun never sets on a Libby label."

"Yes," he said. "It is possible that some of Libby's products can be bought in every country in the world."

Before discussing the organization's mammoth system of production and distribution, he was inclined to go back into its history, before he was directly connected with it, and present the story of Libby, McNeill & Libby's claim to absolute quality in the complete line of its food products. He began by relating events following the appearance of the flying bull's head label on packages of barreled corned beef produced by A. A. Libby & Company, 16th and State streets, Chicago. This was in 1863. The young firm was handling about six cattle per day, and these were purchased by Arthur A. Libby himself. According to the records of this early method which Mr. McDougall quoted, it was Mr. Libby's custom to start buying cattle on Jackson or South Water street as early as two o'clock in the morning—"not simply that he loved hard work or loss of sleep, but from two to six in the morning was the *right time* to buy the *right quality* at the *right price*."

One of the men employed with Mr. Libby at that time, according to Mr. McDougall, commented years later as follows: "Mr. Libby used to preach to us that 'If the market on the raw material gets so high that it wipes out your profit, raise your selling price or quit packing, but cut your quality—never'."

From there Mr. McDougall was urged into a fuller delineation of the story back of the Libby label. His first statement covered a scope of 68 years of growth and international expansion. "There is nothing, actu-

E. G. McDougall being greeted by a native Hawaiian maiden on arrival by plane at one of the company's pineapple plantations

ally, in the history of our development," he said, "that did not come as the obvious result of a natural process of growth plus the capitalizing of opportunity of conditions and circumstances existing at the time."

An organization which started under the direction of two "ambitious young men" back in 1863, Arthur A. Libby and Charles P. Libby, with a plant production derived from six cattle a day and a sales force of two men, underwent a healthy, natural growth by the capitalizing of opportunity. It was largely a process of invading and conquering new fields. Mr. McNeill joined the company in 1867. In 1888 it was incorporated as Libby, McNeill & Libby, and the firm moved to the Union Stock Yards.

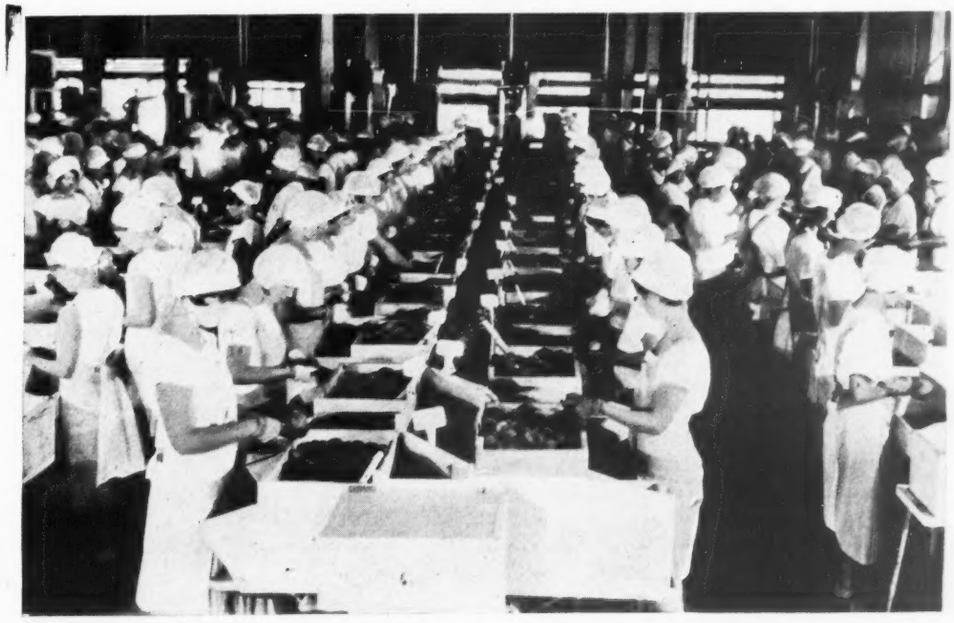
Libby, McNeill & Libby, canners and packers of meats exclusively, were successful—so successful, in fact, that the available cattle supply was not sufficient. Although the corned and roast beef behind the flying bull's head label was now coming from a thousand cattle per day, it could not be produced in quantities to permit continued rapid growth, and consequently, in 1905, pickles and condiments were added to the line.

As Mr. McDougall pointed out, the young firm capitalized one of those perhaps quite natural processes by which, somehow, human taste for meat is accompanied by a taste for pickles, kraut, catsup, mustard, and olives. Libby's pickles and condiments were popular from the first. Soon the growing demand forced the department out of its small corner in the Chicago plant, and it was established at Blue Island, Ill., an immense plant covering a four-acre lot. Today, Libby's pickles and condiments are packed in plants in many sections of the United States and Canada.

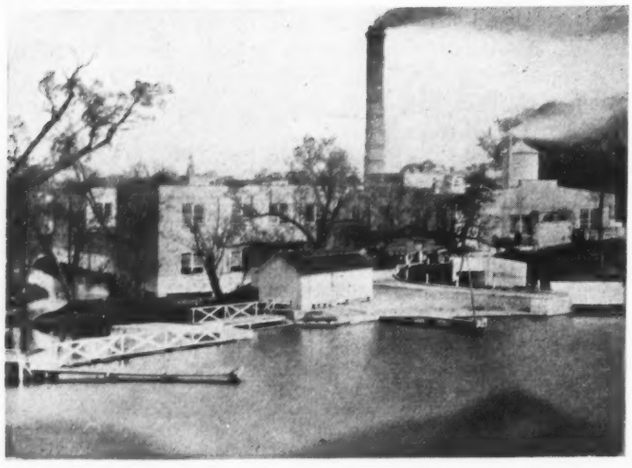
And safeguarding the standard of quality for this immense division are the Libby men at the pickle-salting stations. They are farmers, salesmen, supervisors buyers, shippers, and diplomats all in one. They are the men who induce the land owner to raise the products. They supply him with "pedigreed" seed and oversee his cultivation; and they look with critical eye for the off-size "nubs" and "crooks." They are trained to buy only the best at best prices, just as Mr. Libby bought his cattle.

In 1907, California fruits and vegetables went behind the Libby label. By this time the organization was placing a new value on its well-won claim to highest quality. It had built up a prominence in the industry by its standard of buying the best possible quality products. Now it began building a system of production and distribution which would carry these highest standards of quality right through to the final consumer.

"Fruits and vegetables must be canned while they are fresh from the vine or tree if they are to be marketed



Girls preparing fruit in one of the huge Pacific Coast canneries of the Libby company



This Libby milk condensing plant is at Whitewater, Wis.

under a quality label," Mr. McDougall said. "And we realized that our entire production machinery must be organized to speed up this process."

In this way he explained the simple basis on which the company's mammoth production system rests. In the heart of the greatest growing centers, Libby's canneries have sprung up; throughout the fruit and vegetable regions from Kent, Wash., to Chino, Calif., dotted over the Hawaiian Islands on the very edges of its great pineapple plantations; along the Alaskan Coast, from which the great fleet of Libby fishing boats go out to the spawning places of salmon; down the Pacific coast from the Bering Sea; close to the livestock regions of the Argentine and Uruguay; in the corn, peas, pickles, and condiments districts of the United States and Canada; and tucked away where cattle graze in dairy sections of the United States.

The record of Libby, McNeill & Libby is noteworthy because of its almost phenomenal expansion of its line from three meat items to hundreds of food products gathered from nearly every part of the globe. In a comparatively short period, Libby became a world organization. Its success in the new fields invaded, Mr. McDougall pointed out, must be attributed to a well-planned system of co-ordination between production and distribution facilities.

"It is around this one point," he said: "the insistence upon canning and preserving a product while it was fresh, and its final delivery in prime condition, that Libby developed not only its present far-flung production facilities but its system of quick distribution. Libby built a cannery at the point of greatest supply to attain this. Then it saw the need of branch houses conveniently located in logical centers of distribution.

"You see, we had in mind at all times that aside from quality of products, the efficiency of distribution would be a deciding factor." Today, Libby operates approximately 50 branch houses in the United States and foreign countries, and in addition has scores of foreign sales agencies.

He went on to say: "The fact that a large variety of products is sold under the Libby label has proved of great advantage to wholesalers, through whom we sell a large part of our output. They are enabled to obtain their requirements of canned goods from one source and, by the aid of pool cars, to take advantage of carload freight rates. Furthermore, through our branch houses, located at central distributing points, we enable wholesalers to obtain more prompt and dependable shipments.

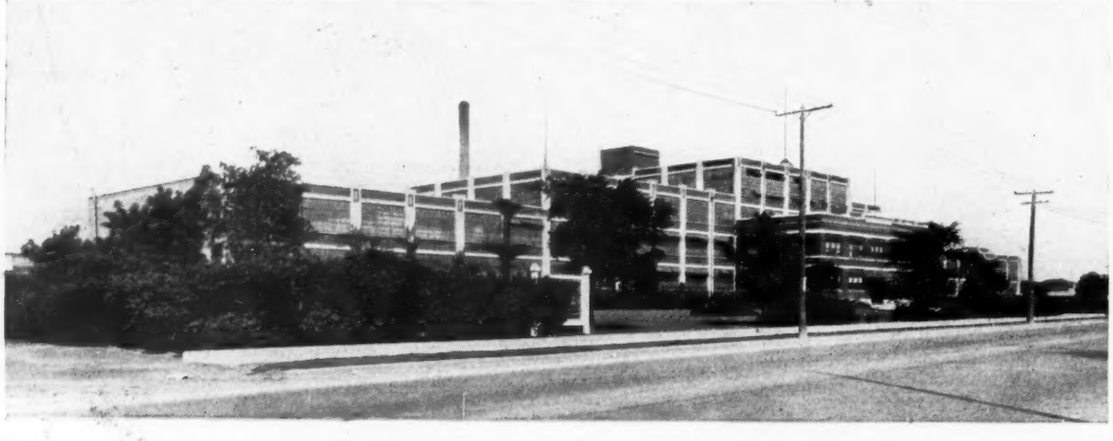
"This service has lent itself advantageously to the trend of rapid turnover. Small wholesalers are able to buy more frequently and in small quantities, and correspondingly increase their earnings without having as heavy an investment as otherwise would be required. Naturally, this advantage has been passed on from the wholesaler to the retailer.

"During the past few years, we have paid a great deal of attention to the needs of the retailer from the standpoint of display material and merchandising helps, and such material that we are furnishing him today brings him definitely into the picture, and is rapidly growing in popularity.

"This, of course, has been just a part of a greatly increased amount of advertising designed to popularize the Libby label with consumers, so that today our advertising activities embrace practically every important medium."

Back of Mr. McDougall's entire discussion of the Libby system one caught the inference: Libby packs where its foods grow best and packs them while fresh, and thus carries out, in a world-wide scope, a policy established over a half century ago by "three ambitious young men" in a small plant at 16th and State streets, Chicago.

Libby's Blue Island, Ill., plant produces pickles and condiments as chief among its many products



Determining the Cost Of Small Apples

By RICHARD G. WILLIAMS
Consulting Engineer
John Hawks Wilson Company
New York City

PRODUCING a product that is technically perfect, as far as it is humanly possible to make it, may be a source of great pride, but unless it is done on a sound economic basis it will be unprofitable. The best manufacturing methods in the world are not worth much if they do not yield a profit; yet when this condition exists, the reason may be sought in selling prices, selling expense, or raw material costs. In this instance the product was right. It sold at the top of the market with comparatively small sales effort; but the cost of the raw material, apples, was at one time a little understood factor in costs.

Every canner knows that there is very little money in running small apples for canning. In other words, a canner who can get large apples will find his costs decidedly lower than if he has to run on small apples. Consider for a moment two bushels of apples which have been graded to size: say 3-in. diameter and 2⅜-in. diameter. In the 3-in. diameter size there will be 120 to 125 apples, while in the 2⅜-in. diameter size there will be from 250 to 260. Therefore, the weight of approximately twice as many cores from the small apples goes into the waste bin instead of into the cans. On the other hand, approximately twice the weight of fruit will be put through the machines per hour when running on the larger apples. Since the machine operators are paid on an hourly basis, the labor cost per dozen cans will be much lower when large apples are being used. Other costs, such as steam, electricity, and overhead charges, per dozen cans will also be lower when large apples are used.

The tables give data showing the comparative value of apples of different sizes, collected over a period of time and presented with the hope of helping to put the canning of apples on a more intelligent basis.

When working out the data in Table I, it was assumed that a plant contains ten units of Coons coring, peeling, and slicing equipment, and that the semi-automatic feeders and parers are belted so as to operate at 28 strokes per minute per cup. Since a machine has two cups, the maximum number of apples per hour which can be handled per unit is 3,360. It has been found practical to run 3,000 apples per hour per unit, if the apples are of good quality.

It also was assumed that the plant has a juice and pomace equipment sufficient to handle the cores, peelings, and trimmings produced by the ten Coons units; and further, that cider apples cost $0.50 per 100 lb. delivered; and, that the apples put through the machines cost $1.50 per 100 lb. delivered. Also that the plant would produce a total of 3,500,000 lb. of sliced apples per season, at a labor cost of $0.79 per 100 lb. of sliced apples, when the average size of apples used was 2⅜-in. diameter.

Note from column Q in Table I that, when 2⅜-in. diameter apples are worth $1.50 per 100 lb. delivered, it costs almost $1 more per 100 lb. to use 2¼-in. diameter apples than it does to use apples of 2⅝-in. diameter.

From the figures in Table I, comparative worths have been calculated. (See Table II.) For example, taking 2⅜-in. diameter size as a basis, 2¾-in. diameter size are worth 30 per cent more; 3-in. diameter size are worth 43 per cent more; and 3¼-in. size are worth 50 per cent more.

From this data it will be seen that the size of apples has a very important effect upon the cost of producing sliced apples for canning and that any effective scheme of inspection for determining the worth of apples for canning must take the size of the apple into consideration.

Table II—Comparative Worths When the Worth of 2⅜-in. Diameter Apples Is Taken as the Base Line

Apple Diameter (In.)	Value of Apples, per 100 Lb. Delivered									
	$1.50	$1.40	$1.30	$1.20	$1.10	$1.00	$0.90	$0.80	$0.70	$0.60
2¼	$1.23	$1.15	$1.06	$0.99	$0.91	$0.82	$0.74	$0.66	$0.57	$0.49
2½	1.50	1.40	1.30	1.20	1.10	1.00	0.90	0.80	0.70	0.60
2⅝	1.69	1.58	1.46	1.35	1.24	1.13	1.02	0.90	0.79	0.68
2¾	1.87	1.74	1.62	1.49	1.37	1.25	1.13	1.00	0.87	0.75
2⅞	1.95	1.82	1.69	1.56	1.43	1.30	1.17	1.04	0.90	0.78
2¾	2.04	1.90	1.77	1.63	1.49	1.36	1.22	1.09	0.95	0.81
3	2.15	2.00	1.86	1.67	1.58	1.43	1.29	1.15	1.00	0.86
3⅛	2.20	2.15	1.90	1.76	1.61	1.47	1.32	1.17	1.03	0.88
3¼	2.25	2.10	1.95	1.80	1.65	1.50	1.35	1.20	1.05	0.90

The method of arriving at comparative worths is as follows: Take the 2¾-in. diameter size and the 3-in. diameter size for example. It is desired to find out how much more the 3-in. diameter apples are worth than the 2¾-in. diameter size. From Column Q in Table I it is seen that the difference in cost of producing sliced apples between the two sizes is $0.79. ($3.24—$2.45 equals $0.79.) Take the amount in Column K for the 3-in. diameter size ($1.77) and add to it the $0.79, making $2.56. To this add the Column J value (for the 3-in. diameter size) and divide the sum obtained by the number of pounds appearing in Column F (for the 3-in. diameter size). That is, $2.56 plus $0.06 equals $2.62. Divide $2.62 by 122, equals $2.14. If $2.14 per 100 lb. had been paid for 3-in. diameter size, as against the $1.50 per 100 lb. paid for the 2¾-in. size, as per Table I, the cost of producing sliced apples would have been the same in both instances: $2.14 divided by $1.50 equals 1.426. That is, $2.14 is 43 per cent more than $1.50. Then 3-in. diameter apples, all other things being equal, are worth 43 per cent more than 2¾-in. diameter apples.

Table I—Cost of Producing Sliced Apples From Various Sizes of Whole Apples

Diameter of whole apples in in.	Approximate number of whole apples per 100 lb.	Approximate weight per apple in lb.	Approximate volume per apple in cu.in.	Lb. of sliced apples produced per 100 lb. of whole apples	Pounds of whole apples necessary to produce 100 lb. of sliced apples	Per cent yield of cores, peelings and trimmings. (C. P. & T.)	Lb. yield of "C. P. & T's" per 100 lb. of sliced apples	Value of "C. P. & T's" @ $0.50 per 100 lb.	Value of 100 lb. of sliced apples, when whole apples cost $1.50 per 100 lb.	Lb. of whole apples used per hr. per machine unit	Lb. of sliced apples produced per hr. per machine unit	Labor per 100 lb. of sliced apples produced	Manufacturing expense per 100 lb. of sliced apples produced	Cost of producing 100 lb. of sliced apples
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2¼	640	0.156	0.596	57	175	37.3	65.3	$0.326	$2.30	468	268	$1.07	$0.36	$3.73
2½	535	0.187	0.710	65	154	28.5	43.9	0.220	2.09	561	364	0.79	0.36	3.24
2⅝	465	0.219	0.818	70	143	23.0	32.9	0.164	1.98	657	459	0.63	0.36	2.96
2¾	400	0.250	0.946	75	133	17.5	23.3	0.116	1.88	750	561	0.51	0.36	2.75
2⅞	350	0.287	1.089	77	130	15.3	19.9	0.100	1.85	861	659	0.44	0.36	2.65
2¾	300	0.331	1.258	79	127	13.1	16.6	0.084	1.81	993	776	0.37	0.36	2.54
3	270	0.369	1,414	82	122	9.8	12.0	0.060	1.77	1107	900	0.32	0.36	2.45
3⅛	235	0.425	1.605	83	120	8.7	10.4	0.052	1.75	1285	1070	0.27	0.36	2.38
3¼	215	0.463	1.797	84	119	7.6	9.0	0.045	1.74	1389	1165	0.24	0.36	2.34

Explanation of how the figures in Table I are obtained: Column B—By counting the apples per bushel in the graded size, and then increasing to 100-lb. basis. Column C—By dividing 100 lb. by the approximate number of whole apples per 100 lb. as per Column B. Column E—By actual tests. Column F—By solving the equation, X: 100 as 100: Column E. Column G—It is assumed that the actual yield of cores, peelings and trimmings is only 90 per cent of the theoretical evaporation of juice, pieces falling on the floor, and sticking to the machines accounting for 10 per cent loss. Amounts in Column G are obtained by taking 10 per cent from amounts in Column E, then deducting the balance from 100 per cent. Column H—Column G per cent of Column F. Column J—Column H times $0.50 per 100 lb. Column K—Column J deducted from Column F times $1.50 per 100 lb. Column L—3,000 productive strokes per machine unit per hour times Column C. Column M—Column L divided by Column F. Column N—At a labor cost through the slicing operation of $0.55 per dozen cans, containing 70 lb. of sliced apples made from 2⅜-in. diameter whole apples, the labor cost per 100 lb. of sliced apples comes to approximately $0.79. Now, $0.79 x 364 (pounds of sliced apples produced per hour from 2⅜-in. diameter size) equals $2.88 as the hourly labor cost per unit. Amounts in Column N therefore obtained by dividing $2.88 by Column M. Column P—On an assumed yearly total manufacturing expense of $12,500, which includes depreciation, and a season production total of 3,500,000 lb. of sliced apples. Column Q—Totals of Columns K plus N plus P equals cost of producing sliced apples per 100 lb.

Foods as a Factor in Manufacture and Distribution

IN succeeding numbers of FOOD INDUSTRIES some detailed figures dealing with the distribution of manufactured foods, as brought out by the recent U. S. Census of Distribution, will be discussed. Food, of course, is a necessity, and all must buy it in sufficient quantity to sustain life. However, there is a great difference between the minimum and maximum shares of the nation's expenditures that might be expended for food.

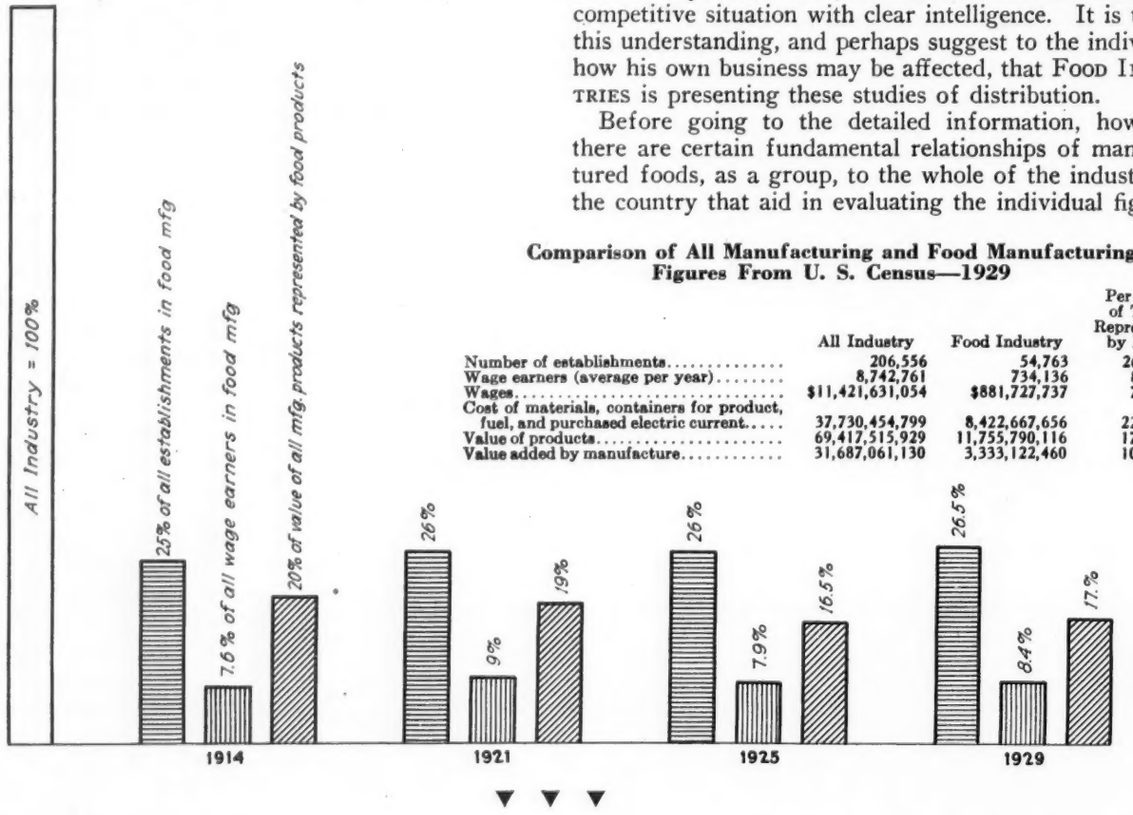
Thus we find food, as are all other commodities, in an increasingly severe battle for the dollars of the ultimate consumer. This affects all food manufacturers, even though their products may not be sold to the retail trade but rather to other food interests to enter into the finished products of these latter.

Therefore, a clear knowledge of the place of food in the general picture of American commodity distribution is necessary for those who would meet the inter-industry competitive situation with clear intelligence. It is to aid this understanding, and perhaps suggest to the individual how his own business may be affected, that FOOD INDUSTRIES is presenting these studies of distribution.

Before going to the detailed information, however, there are certain fundamental relationships of manufactured foods, as a group, to the whole of the industry of the country that aid in evaluating the individual figures.

Comparison of All Manufacturing and Food Manufacturing Figures From U. S. Census—1929

	All Industry	Food Industry	Per Cent of Total Represented by Food
Number of establishments	206,556	54,763	26.5
Wage earners (average per year)	8,742,761	734,136	8.4
Wages	$11,421,631,054	$881,727,737	7.7
Cost of materials, containers for product, fuel, and purchased electric current	37,730,454,799	8,422,667,656	22
Value of products	69,417,515,929	11,755,790,116	17
Value added by manufacture	31,687,061,130	3,333,122,460	10.5



From the table given above it is evident that food plants are, on an average, organized in somewhat smaller units than are plants throughout industry. Food manufacture occupies 26.5 per cent of all the establishments listed by the census of manufactures, while the value of the products turned out by the food industry is but 17 per cent of the total value of American manufactures.

However, the table also brings out the fact that the food industry operates with a much smaller labor force and a much lower payroll than industry as a whole. This, coupled with a somewhat higher cost of raw materials (as compared to value of products), indicates that food manufacture is at a relatively high level of economy.

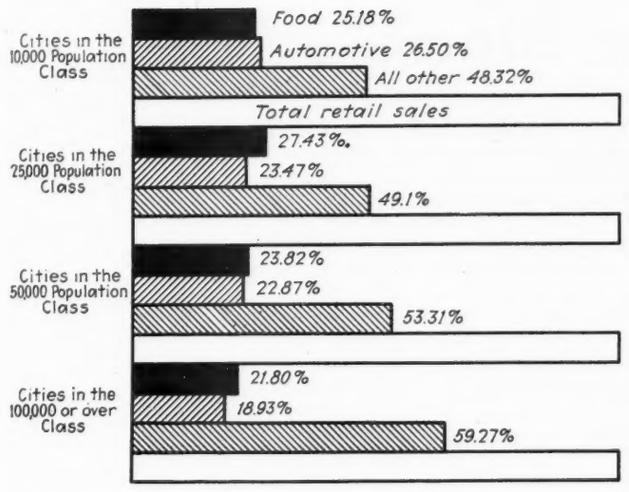
The chart, which is based on U. S. Census figures, indicates the trend of growth of the food industries as compared to all manufacturing.

The number of food processing plants has been a relatively constant percentage of the whole, increasing during the past fifteen years from 25 per cent to 26.5 per cent. This reflects, perhaps, that the tendency toward mergers has not been so active in food manufacturing as elsewhere.

The per cent of all wage earners employed by the food industries is now slightly higher than in 1914, although it is less now than in 1921 or 1925. Although the trend indicated by these figures is not definite, this probably is due to the fact that production was largely increased between 1914 and 1921 without much improvement in equipment or efficiency. Since then, although production has continued to increase, modernization and improved methods have lessened the labor requirements.

Finally, these trends indicate that the value of the products of the food industry has fallen off since 1914, when compared to the value of all manufactured goods. This trend results from the increasing production of automobiles, radios, and similar manufactured goods that did not exist or were made only in small quantity fifteen years ago.

Food's Share of Retail Trade



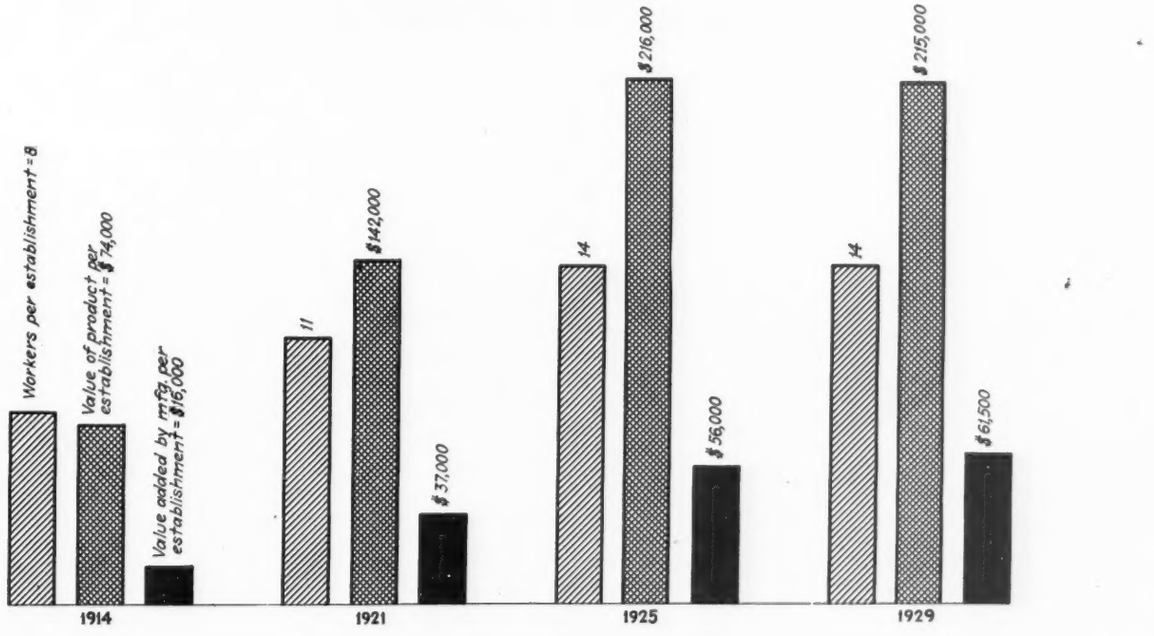
Note that food sales as given comprise all sales through food stores, including such items as soap and matches.

In Food Industries for January, 1931, preliminary figures from the census were given for five typical American cities, showing the amounts expended in retail stores for food, automotive goods, clothing, furniture, and other products. These figures also included the purchases of food in hotels and restaurants.

Since that time figures have been made available for most of the cities of the country, except that the food sales in hotels and restaurants are not included for all. These figures are summarized in the accompanying bar chart, in classes, according to population. The chart indicates that both food and automotive sales form decreasing parts of total sales as the size of the community increases. This, no doubt, is due to the fact that, with the greater mobility that follows ownership of an automobile, residents of rural districts and small cities now tend to purchase more of such items as clothing and furniture in the larger cities.

The chart also indicates that, if the figures for sales through hotels and restaurants were available, the total food sales in each class of cities would be greater than the sales of any other class of commodity.

Trends Within the Food Industries



The bar chart above shows trends that are apparent in the manufacture of foods during the past fifteen years, as brought out by the U. S. Census of Manufactures. During that period the average number of workers in each food factory has increased from eight through eleven to fourteen. From this it is evident that larger units are the order of the day, particularly in view of the fact that there are now fewer plants, although the value of output has greatly increased.

In the same period the value of output per plant has increased from $74,000 to $215,000. Even when due allowance has been made for the greater value of the 1914 dollar, as compared to that of 1929, the trend toward larger units is again made evident.

The value added by manufacture, per establishment, to the raw materials and supplies used has increased during these years from $16,000 to $61,500. This figure shows a trend to grow at a faster rate than other significant factors of food manufacture, which is, no doubt, partly the result of the increased consumption of the more highly processed foods and partly the result of higher wages to workers in the food industries.

In addition to the trends discussed here, there is evidence of increasing efficiency of wage earners in food manufacturing and, at the same time, of increased earnings per worker. These trends are common to all American industry and have their bases in the greater use of power, machinery, and the concentration of manufacturing in larger units. What they portend will be discussed in some detail in a future article.

Cream and Custard Fillings May Cause Illness*

By I. H. SHAW
New Jersey State Department of Health
Trenton, N. J.

THE manner of handling cream- and custard-filled bakery products has become a matter to concern public health officials, because numerous outbreaks of illness affecting a large number of persons have been definitely traced to their ingestion. In order to direct attention to the dangers of such products to the health of the people, a brief review of some of the outbreaks of food poisoning in New Jersey is given here, together with explanations of dirty methods now known to be common to the pastry bake-shop industry.

During the latter part of August, 1927, an outbreak of food poisoning, causing the violent illness of fifty people, was reported in Asbury Park. Cream puffs and eclairs made at a local bakery were said to be the source of the poison. One physician concluded his patients were suffering from metallic poisoning presumed to be arsenic or copper absorbed from utensils. At the same time, it was disclosed that two months previously several had been reported ill after eating pastry from the same bakery. At that time the matter was reported to the health officials and the baker voluntarily discontinued the sale of the articles. However, he again placed cream puffs and eclairs on sale just prior to the August outbreak. Samples of cream puffs and eclairs submitted by Mr. Obert, health officer, to the State Laboratory failed to show any trace of arsenic or other heavy metals, croton oil, or alkaloids. Cultures made from the pastry fillings were found to contain *B. coli* in abundance, and numerous non-hemolytic streptococci. No typhoid bacilli or paratyphoid bacilli were found.

Dr. Obert of New Egypt, son of Health Officer Obert, reported investigations disclosed that the pastry filling was made at night, stored near the oven under optimum conditions for incubation of micro-organisms, and that the filling was used by the baker on the following day.

One year later, August, 1928, R. C. Errickson, health officer, reported a similar outbreak in which 28 people were taken violently ill within three or four hours after eating cream puffs or eclairs purchased at a Long Branch bakery. Samples of cream puffs from the home of one victim were submitted to the State Laboratory by Mr. Errickson, who also submitted samples of feces from four of the sufferers.

Extensive studies in the State Laboratory resulted in the conclusion that the filling used in the cream puffs had become contaminated with bacteria after it had been cooked. Mr. Errickson's report indicates the bakers made cream filling at night, stored it in a warm place, and used it the following day.

On Oct. 12, 1930, C. Boudewyns, health officer, reported an outbreak involving 21 persons suffering from food poisoning in the districts of Rivervale, Emerson, and Washington townships. The cream puffs and eclairs in question were delivered by truck from a bakery in Rockland County, New York, where a similar outbreak occurred at the same time. The symptoms were reported as vomiting, severe cramps, headache, severe diarrhea, dizziness, and part paralysis of the lower limbs.

Mr. Boudewyns reports that the bakery was scrupulously clean and had modern machinery. The ingredients used to make filling were starch, sugar, essences, powdered skim milk, and crushed eggs. The eggs were ordered "fresh" from New York daily. Filling was made up in the afternoon each day, cooked at boiling temperature for a few seconds only, cooled in the kettle under constant stirring until cold, blown into the crust, and immediately cooled in an ammonia-cooled refrigerator. The eclairs and cream puffs were delivered by truck next day until sold.

Mr. Boudewyns points out the improper practice of carrying such articles for long hours without refrigeration in trueks.

On Nov. 16, 1930, L. Van D. Chandler, health officer of Hackensack, N. J., brought five samples of eclairs to the State Laboratory, where he reported an outbreak of food poisoning presumed to have been caused by eclairs. The laboratory reported as follows:

All specimens examined killed laboratory animals when introduced into the peritoneal cavity. A laboratory animal fed part of one of these eclairs died in convulsions.

Microscopic examinations of the material showed a large number of cocci and spore-forming bacilli, together with shorter non-spore formers. Twenty-four-hour cultures showed a non-hemolytic streptococcus to be the predominating organism.

Mr. Chandler's investigation, as reported, showed 24 persons in seven households were made ill on Nov. 15. All were affected with nausea, vomiting, severe diarrhea, sub-normal temperature, and collapse. His study of the cases and the persons associated with those affected led to the conclusion that one lot of eclairs probably was responsible for all of the 24 cases of illness reported. He found the bakery was only a few weeks old and considerably cleaner than the average. Utensils were superficially clean. The pump used to fill the eclairs was not taken down and cleaned. At a later call, the writer, together with a representative of the State Department of Health, found strawberry jelly under the plunger of the pump after it had been put away as "clean."

The careful epidemiological studies of these outbreaks indicated that eclairs and cream puffs were the cause of many cases of illness reported by health officers and perhaps caused many unexplained cases of illness. Therefore, on Nov. 17, 1930, the writer began a study of custard- and cream-filled bakery products and the conditions under which they were prepared and sold. This study has been made in 42 bakeries located in sixteen cities and towns in seven counties of New Jersey.

IN THE beginning, eighteen samples of cream puffs and eclairs were collected and submitted to the laboratory. The laboratory reports showed a wide variety and large numbers of micro-organisms in practically all samples.

Although the substances used in making eclairs and cream puffs varied considerably, the character of the articles in general may be understood from the following common description:

The shells, which were thoroughly sterilized in the baking process, were made from flour, lard, water, milk, eggs, and a pinch of carbonate of ammonia. Sometimes the shells were chocolate-coated before or after the filling was inserted The custard filling consisted of 1 qt. whole milk, 3 oz. sugar, 2 oz. cornstarch, 5 eggs, flavored with vanilla to suit.

The milk and sugar were heated to boiling in copper, tin-lined, aluminum or porcelain kettles. Cornstarch and eggs were stirred into the boiling mass, which ordinarily was cooked only one or two minutes to thicken. The cooked custard was promptly emptied into wood, tin, porcelain, or earthen vessels and placed in the open air on tables, racks, window ledges, or other out-of-the-way place, generally within the bake room, to cool down to room temperature.

*From a paper read at the Annual Conference of State and Local Health Officials, Trenton, N. J., Feb. 13, 1931.

This material was commonly stirred occasionally during the process of cooling, which took from 30 minutes to as much as seven or eight hours before it was used. (Three out of the lot of 42 bakers declared they injected the custard while hot.) By testing the custard in use at a number of places, it was found the temperature ranged from 58 to 115 deg. F.

The custard when ready for use was ordinarily dipped into a metal filling machine by the use of cardboard dippers, spoons, and sometimes with the bare hands. The machine, as ordinarily used in nearly all bakeries visited, showed conclusive evidence that it was not thoroughly cleaned daily. The crude fastenings of the handles and plungers made cleaning difficult. By taking the machines apart and showing the dirt on plungers, much embarrassment was caused the owners of bakeries that in other respects appeared clean. Masses of the moist filling and dirt in combination sufficient to grow millions of bacteria were commonly left in the supposedly clean machine, which remained unused for hours in a warm room. More or less of such filth was mechanically moved with each succeeding batch of custard into the eclairs and cream puffs so filled. These machines so contaminated were commonly kept filled with custard for several hours in a warm place near the retail counter, where, as customers called, eclairs and cream puffs were filled.

One other source of contamination of pastry products was the common canvas pastry bag which is cone-shaped and provided with a metal tube at the small end through which whipped cream, custard, and other fillings are injected into shells of various kinds. The metal tube is very important because it gets clogged. Some bakers clear the clogged tube by placing it in the mouth and blowing their breath forcefully into the mass of filling.

The pastry bags were cleaned by washing in cold and hot water, but were not sterilized, as they should have been if they were to come in contact with milk and egg substances, particularly those which were not cooked after such handling.

Some few bakers put filling into pastries by the use of spoons or spatulas after splitting the shells. Some merit appears in their plans, as a thoroughly chilled thick filling may be used in this way.

It is believed all pastry fillings containing milk, eggs, or cream, whether cooked or not, in shell or out, should be cooled promptly below 50 deg. F. and kept at such temperature until delivered to the consumer. The practice of marketing such articles without refrigeration in restaurants, stores, trucks, and roadstands should be condemned.

Condemnation of every bakers' product is not intended. However, since cream- and custard-filled bakery products have been the cause of much illness, the consumers are within their rights if they demand proof of the safety of these products.

A Program of Equipment Maintenance Aids Efficiency and Saves Expense*

By H. F. JUDKINS
General Ice Cream Corporation
Springfield, Mass.

FAILURE of plant equipment to measure up to standards of performance which it is intended to maintain is frequently brought about, first, because employees do not understand how to use the equipment properly, and second, because the system of plant maintenance is poor or inadequate.

In many cases, the average operator of a machine knows very little about what that machine is supposed to accomplish, and frequently not very much about its mechanism. If it is a straight-away milk-can washer, for instance, he knows that the cans are fed in at one end and, barring accident, come out at the other. That, generally, is about the extent of his knowledge and in a general way goes for almost any machine. It is particularly true, however, of washing equipment, because the mentality of employees doing this work is generally the lowest of any of the employees in the plant. Another thing that commonly happens, even though the regular operator of a machine may understand it fairly well, is to have the operator of this machine leave the job for various reasons, and a substitute take his place.

Lack of knowledge as to how a machine operates is not confined entirely to operators, by any means. There is plenty of room for education in this respect among the superintendents and foremen. I have finally come to the conclusion that while we have accomplished something in issuing arbitrary rules as to temperatures, strength of solutions, and the like, if we are going to get anywhere from where we are now, it has got to be through the education of our plant employees all the way from the superintendents down. With this in mind, we are now preparing a series of job specifications. These job specifications are being prepared in the following form:

First, a preamble describes the result that the job is expected to accomplish. Second, a section tells how to operate the machine to secure the desired results. Third, some of the more likely causes of improper results are then stated, so that the operator can diagnose his difficulty. The specification form for a certain milk can washer given on the following page will give a clear idea of what we have in mind.

It certainly is not enough simply to prepare these specifications and hand them out to the employees. To stop here would do just about as much good as advertising dropped from an aeroplane somewhere out on the Atlantic Ocean. They will be indexed in a loose-leaf folder so that every man and woman working in our plants can have a copy. Our field men will go to each plant and hold a series of meetings with employees, at which time these specifications will be distributed and their importance thoroughly explained.

Now we come to the matter of plant maintenance of equipment. As you all know, it is a common occurrence to find a machine that has been in use for

*Abstract of paper presented at the Dairy Engineering Section of the American Society of Agricultural Engineers, Cleveland, Ohio, Oct. 24, 1930.

Equipment Maintenance Report
(Work to Be Done)

Department ..... **Date Reported** .....
Equipment Defective .....
Nature of Defect .....
.....
.....
Signed .....

Equipment Maintenance Report
(Work Completed)

Department ..... **Date Repaired** .....
Defect Reported by .....
Nature of Defect .....
Cause of Defect .....
Remedy .....
.....
.....
Signed .....
Maintenance Department

some time working very improperly. This again is due mainly to the fact that neither the machine operator, foreman, nor maintenance chief realizes what the machine is all about. It is due also to the fact that in many plants there is no systematic inspection of machines and reporting of defects to the maintenance department.

The logical person to first notice the defective operation of a machine is the operator of that machine. His foreman, too, if he is on the job, will also soon notice the defect. In addition to these sources of information, a representative of the maintenance department should, I believe, systematically and at frequent intervals check over the different machines when they are in operation. Frequently when we find a machine that is not in proper condition, the operator has the alibi that he reported the condition probably at least a month previous to the foreman or directly to the maintenance department and that nothing has been done about it. We believe that we are going to be able to improve our equipment maintenance by the use of a blank form such as that shown herewith.

Further Considerations of Equipment Maintenance*

By W. E. GUEST
Kraft-Phenix Cheese Company

MANY problems of plant equipment maintenance have a direct relation to details of location and construction of the plant itself. The following points, I believe, are worthy of further study:

1. A survey for plant showing railroads and highways, alleys, elevations, drilling for foundation. I know of a milk plant recently located on a site admirably fitted for its purpose, except that the boiler room was placed over a fill used by an old sawmill. After the boiler equipment was put in, the floor sank. The construction contractor was gone, so the maintenance engineer had the job to fix it up.

2. Sewage and water location, description, and supply. Any who have plants in Wisconsin or New York State understand the full import and necessity of full consideration of these points in locating a plant.

3. The type of building and its construction. Floors not properly pitched to drains wear excessively. If tile are used, we must know the proper cement to use between them to keep the lactic acid from loosening them. If cement is used, we must know the proper hardener to use. Whether steel or wood window frames are best fitted for certain types of dairy plants; where and when to use glazed tile walls in place of brick; and the kind of paint to use in various departments must be determined if maintenance problems are to be kept at a minimum.

Continuously in these examples, and those given by Mr. Judkins, comes the question of cost of maintenance. A committee of the International Association of Ice Cream Manufacturers has reported a standard of depreciation rates for various types of ice cream equipment. This is based on accounting principles, on replacement, obsolescence, and maintenance costs. This report recognizes that depreciation varies according to the care and use.

*Discussion presented at the Dairy Engineering Section of the American Society of Agricultural Engineers, Cleveland, Ohio, Oct. 29, 1930.

Specification for Operating Milk Can Washer

(Hydraulic Straightaway)

Object:

The object in view in operating this can washer is to secure throughout the operation a clean, dry, sweet-smelling, commercially sterile can and cover. The can should be cleaned on the outside. The cover is to be placed on the can by the lid replacer as the can leaves the machine. A can may be clean and dry and not commercially sterile. By commercially sterile is meant a can containing not more than 100,000 bacteria as determined by rinsing the can with 500 c.c. (about a pint) of sterile water (water entirely free from bacteria) and plating [inoculating culture media with] 1 c.c. of this rinse in the usual manner.

Operation:

1. See that washer is properly greased and oiled.
2. Fill, wash and rinse tanks with fresh water, about 1 in. below overflow.
3. Turn on steam through thermostatic controls. See that these controls are kept in working order.
4. Open water valve on inlet pipe to rinse compartment to *barely* make rinse tank overflow.
5. Wash tank holds 140 gal. Add the amount and kind of washing powder prescribed.
6. Keep a sterile solution, as prescribed, of cleanser in small solution tank at all times and adjust petcock to proper point to maintain proper washing-powder strength in tank.
7. Laboratory will test solution in wash tank and keep operator advised as to operation.
8. Remove sides of washer and start pumps, to be sure jets are set "O.K.," and that washing solution is not shooting into rinse tank or rinse water out onto draining table.
9. When water in wash tank is 160 to 170 deg. F. and rinse tank 170 to 180 deg. F., you are ready to go. Maintain these temperatures at all times and don't let rinse tank overflow too much, just slightly at a time. *No water is to be added to washing solution tank.*
10. Adjust pre-rinse and steam sterilizing and drying valves.
11. Drain cans thoroughly before washing.
12. Operate at high speed for cans that have contained milk and low speed for cans that have contained cream or condensed milk.
13. Change water in wash tank at least after each fourth hour of operating, and oftener, if necessary. Follow directions for recharging with cleanser.
14. Clean strainer to pump when solution is changed. Report at once any tear found in strainer.
15. Examine cans as they come from washer. Brush and re-run any that are not clean. Note whether cans are being dried properly. See that cover replacer is working.
16. If washer fails to work as above outlined in any particular, report it at once to your foreman.
17. Check thermometers frequently.
18. At close of each day's run thoroughly clean the washer. Remove pump strainers and clean.

Trouble Chart

Trouble	Most Likely Causes
1. Cover not regularly replaced.	1. Cover carrier chains out of time. 2. Cover and can not matched as they come through. 3. No cover in position opposite can.
2. Can not clean.	1. Excessively dirty can to start with. Washer perhaps run at high speed. 2. Washing solution not up to strength. 3. Washing solution not up to temperature. 4. Strainer or jets clogged so that cans do not get proper spray.
3. Can not dry or sterile.	1. Rinse water not up to temperature. 2. Jets clogged so that cans don't get proper rinse. 3. Insufficient steam pressure so that cans are not heated to proper temperature in steaming and drying.
4. Foul-smelling can.	1. Can not properly cleaned. 2. Rinse water contaminated with washing solution because: (a) Steam jets in solution tank set so solution "boils" over into rinse, or (b) Rinse tank not overflowing properly.

ABSTRACTS OF CURRENT LITERATURE

COMMERCIAL PRODUCTION OF GLUCOSE. A. E. Williams. *The Industrial Chemist,* Vol. 6, pp. 495-499; December, 1930.

Glucose is prepared by the hydrolysis of starch by hydrochloric acid. The reaction is carried out under pressure in an acid-resisting bronze converter. It is important that frequent samples be taken near the end of the run, so that maximum saccharification is obtained. This usually occurs when the dextrin content has been reduced to less than 2 per cent. Solid glucose is produced by hydrolyzing the starch until the dextrin content is reduced to about 5 per cent. The acid hydrolysis liquor is neutralized with soda ash, decolorized by adsorption with animal charcoal, concentrated by evaporation, and the glucose crystallized from the concentrated liquor.

* * *

INCREASING THE PURITY OF COMMON SALT. T. B. Brighton and C. M. Dice. *Industrial and Engineering Chemistry,* Vol. 23, pp. 336-9; March, 1931.

Preference of butter makers for Eastern salt led to an investigation of the cause of this prejudice. Most samples of salt gave an unpleasant musty odor when dissolved in boiling water, while a sample of a favorite Eastern butter salt gave no odor with boiling water and did not discolor when heated. The odor apparently is due to a very small quantity of organic matter which is present in the salt crystals. This organic matter may be removed by heating fine salt in an oxidizing atmosphere to temperatures of 210-225 deg. C.

* * *

DESTRUCTIVE ACTION OF FINELY DIVIDED SOLIDS ON VITAMIN A. J. K. Marcus. *Journal of Biological Chemistry,* Vol. 90, pp. 507-513; February, 1931.

Storage of a mixture of vitamin concentrate of cod liver oil with granulated lactose at room temperature for a comparatively short time resulted in the destruction of vitamin A. Investigation showed that destruction of vitamin A is general with all powders used, though the rate varies. The destruction of vitamin A is progressive and is the same whether the mixture is stored under carbon dioxide or air. One application of the results of this work is the preparation of a vitamin A—free casein powder by storage for a period of time rather than by the currently used expensive method of alcoholic extraction of the casein.

SOME PROPERTIES OF HONEY COLLOIDS AND THE REMOVAL OF COLLOIDS FROM HONEY WITH BENTONITE. R. E. Lothrop and H. S. Paine. *Industrial and Engineering Chemistry,* Vol. 23, pp. 328-332; March, 1931.

Low-grade honey of dark color would command a better market price if it could be clarified properly. The cooking quality of honey is enhanced by the removal of colloids. It has been found that flocculation of honey colloids can be brought about by the addition of appropriate quantities of bentonite, a colloidal clay whose particles are negatively charged. The precipitation is carried out in a diluted honey solution, but further work is being conducted on concentrated solutions.

* * *

OILS, FATS, AND SOAP INDUSTRIES IN 1930. R. Furness. *Industrial Chemist,* Vol. 72, p. 13; January, 1931.

A review of these British industries presents statistics and pertinent comment on margarine, vitamin A in vegetable oils, the "bacterial" extraction of fats, and synthetic glycerides. Margarines are now being marketed in which the vitamin A and vitamin D contents are equal to that of the best summer butter. Work is going apace on the production of synthetic glycerides which imitate natural fats in texture and other properties.

* * *

COSTLY LEAKS IN THE BAKERY. P. G. Pirrie. *Bakers Weekly,* Vol. 69, p. 55, Feb. 21, 1931; p. 55, Feb. 28, 1931; p. 47, March 7, 1931.

With improper flour handling there is an annual loss of $1,100 in a three-oven plant; accurate weights are essential. Improper mixing may cost the baker 78c. for every 1,000 lb. of bread he bakes. Sixty thousand pounds of dough may be lost annually in a five-oven shop with inaccurate divider operation.

* * *

THE ANTI-NEURITIC VITAMIN. A. G. Van Veen. *Recueil des Travaux des Chimiques des Pays-Bas,* Vol. 50, pp. 200-220; February, 1931.

The active material containing the anti-neuritic vitamin was obtained by extraction of rice husks with activated clay and freeing the vitamin with barium hydroxide. Almost all components were obtained in crystalline form. Various amino-acids and other compounds were identified in the search for the definite material known as the anti-neuritic vitamin.

CONTAMINATION OF FOOD COOKED OR STORED IN CONTACT WITH NICKEL-CHROMIUM-IRON ALLOYS. A. C. Titus, H. B. Elkins, H. G. Finn, L. T. Fairhall, and C. K. Drinker, *J. Ind. Hygiene,* Vol. 12, pp. 306-313, 1930; *Chemistry and Industry,* Vol. 46, p. 1,130 B; Dec. 12, 1930.

Determinations of the quantities of metal dissolved from strips of different nickel-chromium-iron alloys in contact with various foodstuffs during cooking and storage showed that such alloys are hygienically suitable for the manufacture of culinary utensils. The average quantities of the metals dissolved by various foods cooked for 1 hour in contact with the iron alloy containing 15 per cent nickel and 18 per cent chromium was 1.01 mg. of iron, 0.05 of chromium, and 0.06 mg. of nickel per 4 sq. decimeters of surface.

* * *

BACTERIAL DISTRIBUTION IN MILK. Auguste Lumiere and Mrs. A. Dubois. *Comptes Rendus de l'Academie des Sciences,* Vol. 192, pp. 21-3; Jan. 5, 1931.

Much attention has been given to sterilization of infected (especially tubercular) milk, but very little to sterilizing butter and cheese from such milk. To ascertain whether the infection is transmitted from raw milk to the butter or cheese made therefrom a sterile sample was inoculated with the Koch bacillus, the cream was separated centrifugally, and butter and cheese were made from the sample. Cheese samples from both kinds of curd gave a positive Ziehl color test, whereas the whey gave a negative test. These results show that the tubercular infection in raw milk is concentrated in the skim milk, and then in the cheese, when the raw milk is used in making butter and cheese. Hence the principal danger in using infected milk is passed on to the consumers of the cheese, not of the butter.

* * *

BAKERY REFRIGERATION. F. P. Siebel. *Bakers' Weekly,* Vol. 69, p. 57; Jan. 24, 1931.

The greatest refrigeration problem in the bakery is temperature control of the high-speed dough mixer close to 80 deg. F. Temperature and humidity control are important factors in various bakery operations, such as flour storage and pannery fermentation. A table of proper storage temperatures and humidities is given for various bakery materials and operations.

* * *

DIASTASE IN HONEY. H. W. de Boer. *Chemisch Weekblad,* Vol. 27, pp. 646-8; Nov. 29, 1930.

Pure food standards now generally recognize the loss in quality in honey due to destruction of the diastatic activity by heat. Thus the German ordinance of March 21, 1930, relating to honey declares unfit for use (except in baking) any honey which has been

heated enough to caramelize it or to destroy or greatly diminish the diastase content. In Holland, honey with a substandard diastase number can be sold only under the designation "heated honey." To test the reasoning on which such regulations are based, quantitative experiments were made to ascertain the actual effect of heat on the diastase number of honey. No loss was observed after heating 24 hours at 60 deg. C., but at 65 deg. C. there was a loss of 3 to 4 points in 24 hours, or about 1 point in 7 hours. In general, a fresh honey which has not been heated before, can be heated 12 hours at 65 deg. C. without serious loss. At 70 deg. C. the diastase number decreases about 1 point in 4 or 5 hours; at 75 deg. C., in 2 to 2.5 hours; at 80 deg. C., in 10 minutes; at 90 deg. C., in 2 minutes; at 95 deg. C. in 45 seconds. These are averages; the drop is more rapid in the early stages of heating than toward the end.

* * *

PASTEURIZED MILK. Constantino Gorini. *Comptes rendus de l'Academie des Sciences,* Vol. 191, pp. 885-6; Nov. 10, 1930.

In Italian dairy practice, as exemplified by the central dairy at Milan, a slow, mild pasteurization is employed (30 minutes at 145 deg. F.). At this temperature the thermophilic bacteria not only survive but actually thrive. If the milk is then kept at summer temperature, the resulting changes are more rapid than those caused by the lactic ferments and the acido-proteolytic coccus. When the thermophilic acido-proteolytic bacteria of the *subtilis* group occur in milk, there is great risk of spoilage. For protection against this cause of loss, it is necessary to cool the milk to below 50 deg. F. with the least possible delay after pasteurization. Keeping qualities of pasteurized milk depend on the kind of organisms surviving and not on the actual bacterial count.

* * *

NEW MASH MACHINE. *Zeitschrift des Vereins deutscher Ingenieure,* Vol. 75, pp. 90; Jan. 17, 1931.

The rapid-cooling mashing apparatus described is expected to be a useful improvement for sugar refining and in the fermentation industries. Its cooling surfaces consist of semicircular hollow disks, cooled on the countercurrent principle. The cooling water traverses each disk in a zigzag path, and flows through the hollow central shaft to the next disk. The central shaft is so large that a man can enter it. Forward motion of the mash is effected by means of a screw conveyor arrangement connected with the cooling disks. This construction not only permits remarkably uniform cooling but also makes it possible to warm up a charge again after cooling, so that it will be more fluid and easier to centrifuge. As an example of the use of the machine in sugar refining, it is stated that a 250-hectoliter charge of white sugar can be adequately cooled in 2.5 hours.

REMOVAL OF SPRAY RESIDUES FROM APPLES. J. R. Neller. *Industrial and Engineering Chemistry,* Vol. 23, pp. 323-6; March, 1931.

Hydrochloric acid is an effective cleaning agent for apples in most cases, but it sometimes fails with fruits that have been oil-sprayed or that have become waxy. A thorough cleaning can be obtained by first dipping the apples in certain wax solvents, preferably methanol, after which an unheated hydrochloric acid wash is able to dissolve and remove practically all the lead arsenate residue. Commercial cleaning machines now operating could be equipped with a small pre-dip tank to hold the methanol.

* * *

DISCOLORED CHEESE RINDS. Wilhelm Stocker. *Zentralblatt für Bakteriologie,* Vol. 82, pp. 405-6; Dec. 30, 1930.

Investigation of an epidemic of blackened rinds on soft cheeses and on Tilsit cheese showed that most of the cases could be accounted for by the presence of *Monilia nigra.* Some of the blackened cheeses, however, were not contaminated by this fungus. A close study of the organism causing staining of these cheeses revealed it to be a rod-forming, non-motile, gram-positive, strictly aerobic organism. Cultured in skim-milk, it gave an odor faintly reminiscent of limburger cheese, and blackened the milk completely in 4 weeks without curdling it. For the black pigmentation, the optimum temperature of this organism is 12 deg. C., but growth and pigmentation were fairly active at 4-6 deg. C. The outbreak of cheese staining which led to this investigation occurred during and just after a mild winter, during which artificial heating of the cheese rooms had been deemed unnecessary at frequent intervals. This provided favorable temperature conditions, and at the same time favored yeast growth, which lowered the acidity on the cheese surface.

* * *

SPRAY-DRIED MILK POWDER. L. H. Lampitt and J. H. Bushill. *Chemistry and Industry,* Vol. 50, pp. 125; Feb. 6, 1931.

A number of variables have been studied in regard to the effect of fat solvents and methods of manufacture on milk powder, as well as effect of moisture on "free" fat and on lactose of spray-dried milk powder. When milk powder absorbs moisture, a "clammy" stage is succeeded by the development of a dry, hard, and powdery texture in which fat is freed. The fat-freeing action takes place at a definite range of moisture content and is irreversible. The critical moisture range is independent of the fat content as such, but is proportional to the amount of solids-not-fat present in the powder.

BOOK REVIEWS

DIATOMACEOUS EARTH. By Robert Calvert, Chief Chemist, Van Schaack Bros. Published by The Chemical Catalog Company, Inc., 419 Fourth Ave., New York City, 1930. 251 pp., 6¼x9¼; 70 illustrations; cloth. Price, $5.

AS THE one-time head of the research laboratory of the principal producer of diatomaceous earth. Robert Calvert is well qualified to discuss its origin, production, and uses. Technologists will find in his book discussions of filtration of fats and aqueous solutions, including cane and beet-sugar juices, fruit juices and cereal beverages, vinegar, vegetable oils, and lard. For many of these, flow sheets are given, showing where filtration occurs and the proportion of diatomaceous earth to add to the turbid solutions to be filtered. It is of interest to find that diatomaceous earth filtration reduces the yeast and mold counts in aqueous solutions remarkably; for example, fermentation of cereal beverages can be stopped by filtration through this medium. There is an excellent chapter on the theory of filtration with a diatomaceous earth medium, and on the factors affecting the filtration rate.

Aside from its value as a filter aid, diatomaceous earth has other useful properties. As thermal insulation, either in brick, powder, or granular form, it has the advantages of being able to withstand high temperatures (800-1,000 deg. C. for average quality earth) without deformation, and of having the lowest thermal conductivity of any of the usual insulating materials.

While the book treats of important phases of technology, the author has for the most part avoided the ponderous style all too common in technical literature, and has made a highly readable work. References to the literature and patents are adequate without the annoying use of many footnotes, and are supplemented by separate author and subject indexes.

This volume is designated as American Chemical Society Monograph, No. 52. EARL D. STEWART

* * *

VOLUNTARY CHAIN STORES. By Craig Davidson. Published by Harper & Brothers, 49 East 33d St., New York City, 1930. 353 pp., 8¾x6; 57 illustrations; cloth. Price, $5.

SUBSTANTIALLY, the author has placed at the disposal of independent wholesalers and retailers a text book on effective merchandising and included details of various plans for co-operation between wholesaler and retailer. Contract forms for voluntary chains are

printed in toto and some fundamental rules of procedure recorded for those who are considering joint operation.

Fourteen of the 27 chapters deal with various phases of merchandising, such as store arrangement, window display, stocking up, store interior, exterior, lighting, with the functions of buying, selling, etc., all treated on a basis where the independent operator of a single unit may profit as much as members of a group.

Necessarily the subject matter deals with chains in the food field, where the widest development of voluntary chains has occurred, but where the field of food retailing has certain basic equalities with several other branches of retail business, those considering voluntary chain operation in other lines will find much valuable information collected in this volume. O. Fred Rost

* * *

Preventative Management (Mental Hygiene in Industry). A symposium edited by Henry P. Elkind. B. C. Forbes Publishing Company, 120 Fifth Ave., New York City, 1931. 5¼x8; 234 pp.; cloth. Price, $3.

ALL too often, the ounces of prevention outlined to prevent pounds of cure for labor troubles achieve this figurative weight advantage simply because they are more vaporous. The usual generalizations to the effect that added employee-welfare efforts mean added net profits would certainly fall particularly flat at this time. But the evidence assembled by the eight contributors to this work, all recognized figures in personnel work, cannot be dismissed as another academic effort to give a corporation the aspects of a country club or a charity hospital.

A fortunate combination of industrial, medical, and academic points of view makes the symposium an ideal starting point for executives who may be wondering just how far efficient management ought to go in applying the X-rays of mental hygiene to the intricate mechanism of human personality.

Now this volume provides no magic formula for eliminating the friction that every individual, and every group, generate in the contact of their self-interest with their environment. It does serve to indicate how disastrous this friction, though often invisible, may be to the individual in its wear and tear on human emotions, and to the corporate structure in its effect on production efficiency. And it indicates where one may turn to find the imperfect lubricants that have so far been developed to reduce this friction to a minimum.

To the executive familiar with progressive personnel policies, most of the facts quoted may be familiar. The interpretations which have been woven around them, however, make it valuable to the initiated as well as to those who are still startled to learn, for example, that noisy surroundings may mean a 19 per cent difference in energy expenditure. It is difficult to see how a reader concerned with personnel problems, on finishing this book, could fail to turn to the bibliography it contains resolved to go deeper into the analysis and control, if that be possible, of the emotional stability of his workers. At least, he could have little doubt that the worker's fears and irritations and delights are just as basic factors in production efficiency as his manual dexterity or intellectual training.

* * *

Man Versus Microbes. By Nicolas Kopeloff. Published by Alfred A. Knopf, 730 Fifth Ave., New York City, 1930. 311 pp., 6½x9½; 130 illustrations; cloth. Price, $5.

INTENDED primarily as a book for the layman, this survey of our knowledge of bacteriology naturally contains little that is new or valuable to those expert in the field as a whole. The strict specialization of many workers concerned with the ways of microorganisms, however, gives such a volume opportunity to serve as a rallying point for those in widely scattered outposts. In spite of considerable material that seems oversimplified and obvious to those who are not laymen in the strict sense of the word, the book justifies itself in this capacity.

The volume is interestingly written, yet it avoids overemphasis of those facts that are easy to dramatize, a pitfall difficult to avoid in the popular treatment of a field so filled with drama. The illustrations are good, and the typography is excellent. It will tell little that is new about one's own line of endeavor, but will help to recall and supplement knowledge in those other vast areas covered by the science that is likely to be forgotten in the daily routine.

One short chapter has been entitled "Microbes Harnessed to Industry." An equally well-written volume for the layman on that subject alone might well be prepared by the author to bring to the attention of the general public that industrial microbes are not so overshadowed by the pathogenic microbes as this volume indicates.

A bibliography and a subject and author index are included.

* * *

Co-operative Retail Buying Associations. By Wilford L. White, Professor of Marketing, School of Business Administration, University of Texas. Published by McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York City, 1930. 207 pp., 9¼x6¼; cloth. Price, $3.

THIS book treats in concise form co-operative buying by retailers. The entire subject is covered broadly and exhaustively on a basis where the book supplies a review of activities in this particular field. The author has succeeded in bringing together an unusual wealth of information and the facts that are presented make possible accurate appraisal of the benefits as well as the dangers of such co-operative effort.

Functions necessary under a co-operative buying arrangement are analyzed thoroughly and in sufficient detail to have that portion of the book practically serve as an operating manual.

The retailer now participating in or planning to join a co-operative buying organization may post himself fully on how best to capitalize such effort. Manufacturers will find the presentation of statistical data on specific operation in various fields extremely helpful in their study of the value of co-operative associations as outlets for merchandise.

O. Fred Rost

GOVERNMENT PUBLICATIONS

Documents are available *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.*

Depreciation Studies. Preliminary report of the Bureau of Internal Revenue; 5 cents. Includes extended lists of allowable rates in calculating depreciation for tax purposes, itemized with respect to individual equipment and facilities for many types of food plants.

Government Specifications, issued by the Federal Standard Stock Catalogue Board, as follows: Spices; Flavoring extracts and non-alcoholic flavors; and Baking Powder; 5 cents each.

Propagation and Distribution of Food Fishes, by Glen C. Leach. Bureau of Fisheries, Document 1098; 15 cents.

Natural History of the Bay Scallop, by James S. Gutsell. Bureau of Fisheries, Document 1100; 30 cents.

Purchase and Consumption of Meat, by K. B. Gardner and L. A. Adams. U. S. Department of Agriculture, Bulletin 1443; 10 cents. A study of consumer habits and preferences.

Work of Food and Drug Administration, U. S. Department of Agriculture, Miscellaneous Publication 48; 10 cents. Outlines scope and character of federal regulatory work.

Sugar-Beet Growing Under Irrigation in Utah. U. S. Department of Agriculture, Farmers' Bulletin 1645; 10 cents. Suitable for distribution to growers.

Retail Distribution Surveys. Bureau of Foreign and Domestic Commerce Merchandising Research Division mimeographed reports. A series of commodity studies from the Louisville grocery survey on the following items: Salt, baking powder, and soda; sugar; soaps and cleansers; table syrups; coffee; flour; cereals; fresh fruits and vegetables; tea and cocoa; dried fruits and nuts; canned foods; and salad dressing.

Fruit Juices and Fruit Sirups Markets. Bureau of Foreign and Domestic Commerce, Trade Information Bulletin 743; 10 cents. A study of the markets for these commodities in the United Kingdom.

Improved Pepper Production in Sarawak, by Carl H. Boehringer. Bureau of Foreign and Domestic Commerce, Foodstuffs Division Special Circular 319; mimeographed.

Fruit and Vegetable Canning in Italy. Bureau of Foreign and Domestic Commerce, Foodstuffs Division Special Circular 320; mimeographed.

Distribution Surveys. Preliminary reports on surveys by the Census of Distribution are being issued as studies are complete; the following have appeared: Flavoring extracts and flavoring syrups; baking powders, yeast, and other leavening compounds; glue and gelatine; biscuit and crackers industry; chewing gum industry; chocolate and cocoa products industry; malt industry; and corn syrup, corn sugar, corn oil, and starch.

PATENT DIGEST

Baking and Milling

Dough Kneaded Mechanically — George W. Dell to Triumph Manufacturing Company, Cincinnati, Ohio. No. 1,787,778. Jan. 6, 1931.

Ice-Cream Cone With Ridged Inner Surface — David Gerber to Joseph Shapiro, Baltimore, Md. No. 1,787,899. Jan. 6, 1931.

Cream Puff Filling Machine—Robert Goff, Jr. One-half to John Hollman, Kansas City, Mo. No. 1,787,900. Jan. 6, 1931.

Dough Divider—Birton M. Ross, Germantown, Philadelphia, Pa. One-half to Charles Pfleger, Philadelphia, Pa. No. 1,788,330. Jan. 6, 1931.

Manufacture of Cake Frosting—Henry F. Olschewsky, Olympia, Wash. No. 1,788,493. Jan. 13, 1931.

Traveling Oven With Return Conveyor for Empty Pans—Corry B. Comstock to Comstock Oven Company, Inc., New York, N. Y. No. 1,789,378. Jan. 20, 1931.

Two-Compartment Baking Oven—Harold H. Hill, Boston, Mass. No. 1,789,406. Jan. 20, 1931.

Beverages

Aerating and Bottling Machine—Arthur James Billows, London, England; Hannah Eliza Billows, administratix. No. 1,788,346. Jan. 6, 1931.

Coffee Roasted Under Pressure—William E. Close, Long Beach, Calif. No. 1,788,705. Jan. 13, 1931.

Combination Grinder and Percolator for Coffee—Leonard H. Englund, Winona, Minn. No. 1,789,334. Jan. 20, 1931.

Canning and Glass Packing

Fruit-Pitting and Coring Machine With a Rotatable Pitting Knife—Wilson W. Havens, Oakland, Calif., to Pacific Machinery Company, San Francisco, Calif. No. 1,785,013. Dec. 16, 1930.

Fruit Pitter With Flexible Knife—Hal W. Norgaard, Burbank, Calif., to Pacific Machinery Company, San Francisco, Calif. No. 1,785,014. Dec. 16, 1930.

Fruit Pitters That Leave Pit Intact—Albert R. Thompson, San Jose, Calif., to Pacific Machinery Company, San Francisco, Calif. Nos. 1,785,015, 1,785,016, 1,785,017, 1,785,018, and 1,785,019. Dec. 16, 1930.

Pitters for Clingstone Fruit—James B. Whipple, Huntington Park, Calif., to Pacific Machinery Company, San Francisco, Calif. No. 1,785,020. Dec. 16, 1930.

Pitter for Freestone Fruit—James B. Whipple, Huntington Park, Calif., to Pacific Machinery Company, San Francisco, Calif. No. 1,785,021. Dec. 16, 1930.

Can-Closing Machine—Alfred J. Chamberlain, Milwaukee, Wis. No. 1,788,659. Jan. 13, 1931.

Heat-Treating Canned Goods—Albert R. Thompson, to Anderson-Barngrover Manufacturing Company, San Jose, Calif. No. 1,789,609. Jan. 20, 1931.

Confectionery

Bar Confections Coated and Wrapped in a Continuous Operation—Fred L. Borchert, Rockford, Ill. No. 1,787,773. Jan. 6, 1931.

Caramel Cutting Machine—Alfred German Rose to Rose Brothers, Ltd., Gainsborough, England. No. 1,788,329. Jan. 6, 1931.

Cracking and Cleaning Cocoa Beans—Swinfeu Bramley-Moore, White Plains, N. Y. No. 1,788,683. Jan. 13, 1931.

Self-Cleaning Corn Popper—James H. Reichart, Muncie, Ind. No. 1,789,157. Jan. 13, 1931.

Cooking Candy in Edible Oil—David Millar, St. Louis, Mo. No. 1,789,983. Jan. 27, 1931.

Hollow Chocolate Forms Closed by Machine—Alfred Winkler and Max Dünnebier, Newvied, Germany. No. 1,790,361. Jan. 27, 1931.

Multiple Unit of Cooking Kettles Equipped With Stirring Paddles That Operate Simultaneously in a Reciprocating Manner—Gavin B. Young to Young's Candy Products Company, Inc., Philadelphia, Pa. No. 1,790,631. Jan. 27, 1931.

Dairy and Egg Products

Albumin and Sugar Extracted From Milk Whey—Elizabeth Mary Meyer, Sherman, Pa. No. 1,787,754. Jan. 6, 1931.

Bottle-Washing Machine—Irving R. Hippenmeyer, Waukesha, Wis., to the Creamery Package Manufacturing Company, Chicago, Ill. No. 1,787,984. Jan. 6, 1931.

Bottle-Cleaning Machine — George J. Meyer to Geo. J. Meyer Manufacturing Company, Milwaukee, Wis. No. 1,787,993. Jan. 6, 1931.

Milk-Bottle Capping Machine—James B. Babbitt, Yonkers, N. Y., and Clifford B. Harris, Weehawken, N. J., to Walker-Gordon Laboratory Company, Inc., Plainsboro, N. J. Nos. 1,789,856 and 1,789,857. Jan. 20, 1931.

Fruit and Vegetables

Mechanical Aid for Packing Fruit—Enos B. Hiatt, Palisade, Colo., to the Carpenter-Hiatt Sales Company, Denver, Colo. No. 1,787,941. Jan. 6, 1931.

Enzymes of Citrus Fruits Produce Citric Acid From Pectinous Materials—Arthur Maurice Peake, London, England, to Commercial Solvents Corporation, Terre Haute, Ind. No. 1,788,739. Jan. 13, 1931.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Mill for Crushing Citrus Fruit—Alfred C. Mathewson, Huntington Park, Calif. No. 1,789,444. Jan. 20, 1931.

General Processes and Products

Meat Diced Mechanically—Adrian C. Van Hooydonk to John E. Smith's Sons Company, Buffalo, N. Y. No. 1,788,214. Jan. 6, 1931.

Water-Softening Unit—Lynn G. Lindsay, Minneapolis, Minn., to Trupar Manufacturing Company, Dayton, Ohio. No. 1,789,314. Jan. 20, 1931.

Nuts Packed in Atmosphere of Inert Gas That Is Fat Soluble—Thomas M. Rector, Rutherford, N. J., to Franklin-Baker Company, New York, N. Y. No. 1,789,946. Jan. 20, 1931.

General Equipment

Change-of-Direction Feed Conveyors for Wrapping Machines—Charles Kehling to American Machine & Foundry Company, Brooklyn, N. Y. No. 1,786,494. Dec. 30, 1930.

Floor Drain—Edward W. N. Boosey, Detroit, Mich. No. 1,786,558. Dec. 30, 1930.

Insect Trap—Stanislaus Deibele, Woodburn, Ore. No. 1,786,704. Dec. 30, 1930.

Steam Boiler With Superimposed Water and Steam Drum — Fred W. Chipman, Framingham, Mass. No. 1,786,981. Dec. 30, 1930.

Water-Softening Apparatus—Edward T. Turner, Dayton, Ohio. No. 1,787,129. Dec. 30, 1930.

Steam Trap With Automatically Controlled Piston Type of Discharge Valve—Edmund T. Hewitt, St. Louis, Mo. No. 1,787,374. Dec. 30, 1930.

Pressure Lubrication—Douglas F. Fesler to Alemite Corporation, Chicago, Ill. Nos. 1,787,439 and 1,787,440. Jan. 6, 1931.

Ventilating Fan and Equipment—Edward L. Anderson, Grosse Ile, Mich., to American Blower Corporation, Detroit, Mich. Nos. 1,787,652; 1,787,653; 1,787,654; 1,787,655; and 1,787,656. Jan. 6, 1931.

Holder for Inserting or Removing Light Bulbs From Sockets—Blowen E. Clarkson, Kingstree, S. C. No. 1,787,670. Jan. 6, 1931.

Foam-Type Fire Extinguisher—William H. Banfil, Boston, Mass. No. 1,788,375. Jan. 13, 1931.

Prevention of Bumping During Boiling of Liquids—Edmund Altenkirch, Alt-Landsberg-Sud, Germany, to Siemens-Schukertwerke Gesellschaft mit beschrankter Haftung, Siemensstadt, Berlin, Germany. No. 1,788,818. Jan. 13, 1931.

Refrigerating System for Cold Storage Rooms—Charles A. Moore, Edina, Minn. No. 1,789,592. Jan. 20, 1931.

Mechanical Refrigeration—Ernest B. Miller and Axel Benzon to the Silica Gel Corporation, Baltimore, Md. No. 1,790,067. Jan. 27, 1931.

Automatic Lubricating System That Operates by Compressed Air—Joseph Amon, Forest Hills, N. Y. No. 1,790,639. Feb. 3, 1931.

One-piece Packing or Shipping Box With Metal Latching Devices—Earl C. Potter to Container Corporation of America, Chicago, Ill. No. 1,790,676. Feb. 3, 1931.

Safety Window—Frank Soo, Chicago, Ill. No. 1,790,880. Feb. 3, 1931.

Slicing Machine With Co-acting Parts to Give Slices Uniform in Thickness and Appearance—Cornelius Franciscus Maria Van Eerkel, Wassenaar, and Jetze Van Hoorn, Voorburg, Netherlands, to U. S. Slicing Machine Company, La Porte, Ind. No. 1,790,888. Feb. 3, 1931.

Lubricant Grease Gun—Russell J. Gray, Minneapolis, Minn. No. 1,790,914. Feb. 3, 1931.

Mixing Machine With Plural Stirrers Rotating Simultaneously at Different Speeds and in Different Zones—Everett P. Larsh to the Master Electric Company, Dayton, Ohio. No. 1,790,928. Feb. 3, 1931.

Viscosity Determined by Apparatus Equipped With Electromagnet to Permit Timing the Rise of Buoyant Body Through Liquid—Samuel T. Rodgers, Shaker Heights, Ohio. No. 1,790,948. Feb. 3, 1931.

Rotary Fluid Pump With Helical Vane—Loren G. Symons, Hollywood, Calif., to Thomas L. Morris, Van Nuys, Calif. No. 1,791,047. Feb. 3, 1931.

Meat Packing

A Resilient Meat Hook—Herbert M. Koebler, Portland, Ore. No. 1,788,722. Jan. 13, 1931.

Continuous Fat Rendering Process—Stanley Hiller, Oakland, Calif. No. 1,789,751. Jan. 20, 1931.

Skins Removed From Pork Bellies by Drum-Type Machine — George Morrison, Denver, Colo., to Swift & Company, Chicago, Ill. No. 1,790,592. Jan. 27, 1931.

Smoking Beef Hams in Oil Soaked Stockinet Bags—John Ellsworth Covey, to Swift & Company, Chicago, Ill. No. 1,790,698. Feb. 3, 1931.

Sausage Stuffing and Linking Machine—Roy C. Knoll to Middle States Manufacturing Company, Chicago, Ill. No. 1,790,868. Feb. 3, 1931.

Flat-Surface Bacon-Skinning Machine With Band Knife—Charles W. Swanson to John Morrell & Company, Ottumwa, Iowa. No. 1,791,067. Feb. 3, 1931.

Sugar and Molasses

Roll Scraper for Cane Mills — William Dunn, Macabi, Cuba. No. 1,787,937. Jan. 6, 1931.

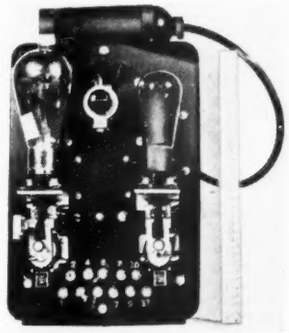
Molasses—Feed Mixer—David E. Skirvin, Junction City, Ore. One-half to Thomas J. Skirvin, Eugene, Ore. No. 1,788,344. Jan. 6, 1931.

Recovering Sucrose From Impure Sugar Solutions — Holyer De Fine Olivarius to California Packing Corporation, San Francisco, Calif. No. 1,788,628. Jan. 13, 1931.

NEW EQUIPMENT FOR FOOD MANUFACTURERS

Photo-Electric Cell Controls Package Wrapping

PACKAGED food products are now being covered with printed protective wrappings in such a manner that the label designations on the wrapper appear uniformly and accurately in predetermined locations as if the container, not the wrapper, were printed. This result is obtained by use of the illustrated photo-electric cell developed by the General Electric Company (Fig. 1) for use on the wrapping machine perfected through the efforts of the Kalamazoo



Vegetable Parchment Company, Kalamazoo, Mich.

Each portion of the printed paper required to wrap an individual package has a small printed spot which serves as a regulator for co-ordinating all operations of the wrapping machine. As this spot passes between the photo-electric cell and a source of light it causes a sending forth of electrical impulses that set in motion the wrapping machine and wrap the container so that the designs on the protective wrapper fall consistently on a predetermined part of the package.

This development makes possible the use of protective wrapping printed to give the finished package a clear, unobstructed label designation which was not possible when the printed container was wrapped with an unprinted wrapper.

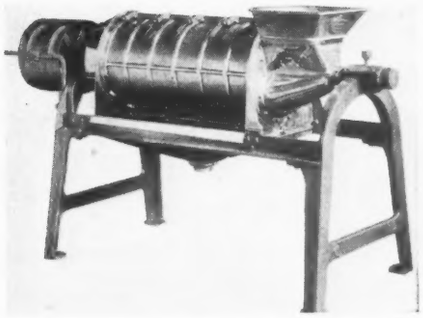
The installation shown in the large illustration (Fig. 2) is reported to wrap 6-oz. packages of a cereal product at the rate of 72 packages per minute.

Juice From Ripe Tomatoes Only

PRODUCTION of fine flavored tomato juice with high vitamin content is claimed for the Indiana juice machine developed by the F. H. Lasenkamp Company, 130 East Georgia St., Indianapolis, Ind. This machine is said to be equipped with two carefully designed rolls that press juice from the ripe tomatoes only. The cores, green portions, or hard spots are passed along a screen with the pomace in such a way that no juice is squeezed from them to impair the juice obtained from the well ripened portions.

The rolls revolve about a shaft and rotate in relation to each other so as to produce a slow pressing or squeezing action on the pieces of tomatoes and to force out the juice. Paddles in the machine keep the tomatoes stirred up after they leave the rolls in order that unpressed tomatoes will fall back on rolls. This stirring action also helps the juice to drain through the screen and keeps the pomace moving along to the discharge opening.

Because the rolls are so adjusted that only the ripe portions of the tomatoes



are pressed the pomace is quite wet. Logically this juice machine should be operated in connection with a pulp machine, so that the juicing and pulping operations can be done in a continuous consecutive manner.

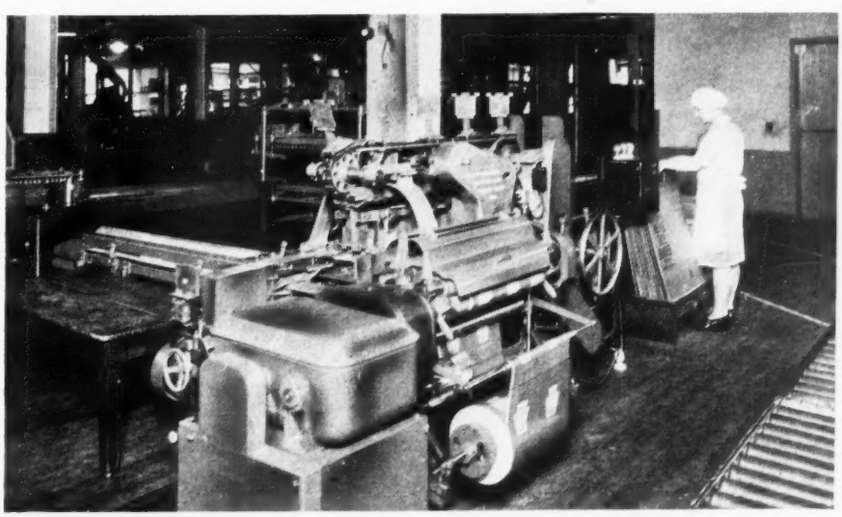
The screen is of Monel metal and has perforations 0.023 in. in diameter. The hopper hood, under-pan, and the pomace discharge chute also are made from Monel metal. The shaft, all castings that come in contact with the products, and the ends of the rollers are made from Tobin bronze. The remainder of the rolls consist of brass with stainless steel shafts.

The juice produced by this machine also is said to have an extremely low air content and to be of proper consistency, thus making the vitamin content more constant from time of canning until consumption and the product less likely to stratify upon standing.

New Aid in Determination Of pH Values

SIMPLIFICATION of *pH*-value determination and control is claimed for the color comparator recently announced by W. A. Taylor & Company, 872 Linden Ave., Baltimore, Md. This

piece of control equipment is, in reality, a means of comparing quickly a test sample containing a definite amount of a standard indicator of the Clark and Lubs series with a set of the indicator solutions prepared by using standardized buffer salts to give the color changes of the indicator through a range of *pH* values. The set of indicator color standards is placed in a slide holder and passed in front of the test sample to get



a color match with the standard having the same *pH* value as the test sample.

These color comparators are available in the *pH* range 0.2-13.6. Each comparator has a range of 1.6 *pH* units, whereas the standards are in intervals of 0.2 *pH*. The set is made in five models to cover the range of any 3, 4, 5, 6, or 7 indicators between the limits of *pH* 0.2 and 13.6. It is molded from Bakelite, which makes it highly resistant to water, acids, and alkalis, and is packed in a portable case.

The 11.5-mm. outside diameter of the tubes containing the test samples gives a layer of material sufficiently thin to enable a technician to test highly colored or turbid liquids accurately without dilution. The slide is calibrated so that when the test solution has been matched with the proper standard the corresponding *pH* value is numerically indicated.

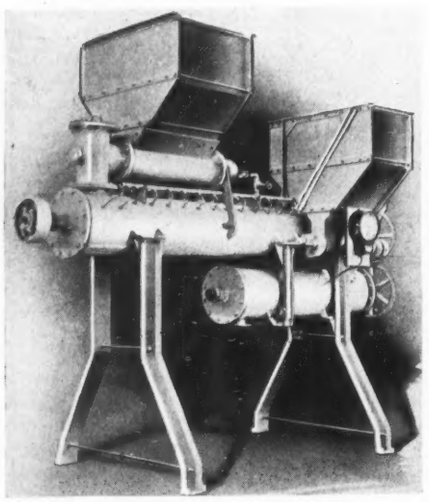
New Glass-Lined Machinery For the Canner

FURTHER application of glass-lined machinery in the canning industry was indicated at the 1931 Canners' Show in Chicago by the exhibit of the Pfaudler Company, Rochester, N. Y. An applesauce machine, here illustrated, a vacuum pan, known as Model D, and a corn blender-cooker were shown for the first time.

The applesauce machine is said to have a capacity of 1,500 to 2,500 cases of No. 2 cans per 9-hour day and to produce a product superior to that made in other type of equipment.

The Model D vacuum pan was designed particularly for producers of fountain syrups. It has a dome construction on top and bottom, is equipped with a bronze basket-type sectional coil, and is of 50-gal. capacity. An agitator is mounted in the bottom head at a 45-deg. angle so that small batches can be processed. Vacuum gages, observation glass, and sampling outlet are included in fittings.

The corn cooker has a capacity of 600 gal. and is reported to have given satisfactory operation during the past canning season.



MANUFACTURERS' PUBLICATIONS

Corrosion-Resisting Alloys—In an attractive illustrated booklet, the Republic Steel Corporation, Youngstown, Ohio, gives specifications, uses, and other data on Enduro Type S, Enduro KA2, and Enduro AA, as well as general information on the Enduro stainless alloys as a group.

Dial Scales—Dial scales for use in the dairy industry are described and illustrated in an 8-page booklet prepared by Fairbanks, Morse & Company, Chicago, Ill.

Oil for Refrigerating Machinery—Various types of oils for use on refrigerating machinery are listed and described in bulletin 30159 of the York Ice Machinery Corporation, York, Pa.

Solid Carbon Dioxide—In a descriptive leaflet, the Delancey Chemical Corporation, 260 South Broad St., Philadelphia, Pa., announces its Thermite service.

Oilproof Packing — Vellumoid manufactured by the Vellumoid Company, Worcester, Mass., is described and its uses illustrated in a leaflet folder.

Delivery Trucks — Electric trucks and compartment truck bodies manufactured by the Walker Vehicle Company, 101 West 87th St., Chicago, Ill., are described in an illustrated folder.

Food Recipes—In a 22-page booklet, published by the National Canners' Association, Washington, D. C., is a compilation of recipes for the use of canned foods in cafeterias and restaurants. These recipes are tested by Alice M. Child and Grace Erskine, Food Research Laboratory, Experimental Station, University of Minnesota.

Unit Cooler—In an illustrated leaflet, the Grinnell Company, Providence, R. I., describes and illustrates its unit cooler equipped with liquid level control mechanism.

Plate-type Heat Exchangers—Bulletin No. 132 is an 8-page booklet, illustrating and describing the construction and use of the heat exchanger manufactured by the York Ice Machinery Corporation, Dairy Equipment Branch, Canton, Ohio.

Precision Scales —Fairbanks, Morse & Company, 408 Rockefeller Bldg., Cleveland, Ohio, in an illustrated leaflet, calls attention to its butter print scales.

Tea Bags—In catalog No. 201, the National Urn Bag Company, Inc., New York City, gives details on styles and uses of its aluminum ring tea bags.

Materials Handling Equipment — In an illustrated leaflet, the Lewis-Shepard Company, Watertown Station, Boston, Mass., describes its jack lift, steel leg platform, steel bin rack, and stackers.

Industrial Thermometers—In Supplement A, Sales Bulletin No. 972, Bristol Company, Waterbury, Conn., gives illustrations and information on its industrial mercurial thermometers.

Water Treatment—In technical bulletin No. 6003, the International Filter Company, 59 East Van Buren St., Chicago, Ill., produces a reprint of the paper on Chemical and Mechanical Utilization of Activated Carbon in Water Purification, by A. S. Behrman and H. B. Crane.

Fats for Industrial Deep Frying and Shortening—Booklets entitled "Fats Used in Doughnut Frying" and the "Practical Requirements of Shortening for Cakes" have been published by the Portsmouth Cotton Oil Refining Corporation, Portsmouth, Va.

Canning Machinery — General catalog Y-100 of the Anderson-Barngrover Manufacturing Company, 70 Pine St., San Francisco, Calif., is a 384-page book devoted to the illustration and description of a complete line of canning machinery and accessories.

Ammonia Ice Cream Freezers — York ammonia ice cream freezers, with ammonia float control, manufactured by the York Ice Machinery Corporation, York Pa., are described and photographically illustrated in a 20-page booklet known as Bulletin 30154.

Temperature Control Equipment — Air-operated controller equipment manufactured by the Bristol Company, Waterbury, Conn., is described and illustrated in the instrument section of catalog No. 4000.

Vacuum Filling and Screw Capping Equipment—An illustrated folder describing high-speed vacuum filling and screw capping equipment and listing some of the nationally known firms using this equipment has been prepared by the Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass.

Finishes for Surface Protection—Industrial, Technical, and Architectural Finishes is the title of a 28-page illustrated booklet prepared by the Norfolk Paint & Varnish Company, Norfolk Downs, Mass., in which specifications and recommendations are given regarding the type and number of coats to be given various types of surfaces.

Welding Electrodes—A well illustrated booklet prepared by the General Electric Company, Schenectady, N. Y., in which is described and classified various types of electrodes, accessories and other equipment devoted to electric welding.

Rubber Products—Rubber belting, packing, hose, matting, and miscellaneous items manufactured by the Diamond Rubber Company, Inc., Akron, Ohio, are illustrated and described in a 12-page artistically bound catalog.

Safety Activities in Small Companies—Industrial Safety Booklet No. 10, published by the Metropolitan Life Insurance Company, New York, N. Y., devotes 16 pages to timely discussion of subjects important in industrial safety programs.

Steel Equipment for Office and Shop—The Angle Steel Stool Company, Plainwell, Mich., in a 30-page bound booklet, illustrates and describes in detail its steel cabinets, chairs, desks, and the like for office and shop use.

Caps for Glass Containers—In a folder devoted to glass packing of grapefruit, the Anchor Cap & Closure Corporation, 22 Queen St., Long Island City, N. Y., lists many uses for Anchor and Amerseal closures.

P. I. V. Gear—In booklet 1274, published by the Link-Belt Company, 910 South Michigan Ave., Chicago, Ill., is described and illustrated the P. I. V. transmission gear and Link-Belt positive drives.

Industrial Pumps—In a series of booklets Goulds Pumps, Seneca Falls, N. Y., describes and illustrates its small motor-driven centrifugal pumps, automatic-oiling deep-well pumps, automatic-oiling pyramid pumps, rotary pumps, and sump pumps.

Industrial Electric Heaters — Various types of industrial heaters and accessory equipment are fully illustrated and described in the 100-page catalog No. 247 compiled by the Westinghouse Electric & Manufacturing Company, Mansfield, Ohio. Many curve charts, definitions of terms, and equation formulas are included.

Corrosion Resisting Equipment—In an illustrated leaflet Niagara Blower Company, 673 Ontario St., Buffalo, N. Y., calls attention to its nickel and Monel metal products.

Casters and Wheel Trucks—Photographic illustrations and detailed tables of specifications are included in a 24-page catalog, No. 29, distributed by the Service Caster & Truck Company, Albion, Mich.

Steam Turbines—Booklets designated as GEA-1011B and GEA-1080A, published by the General Electric Company, Schenectady, N. Y., are sections of a loose-leaf catalog devoted to steam turbines and contain photographic illustrations of installations and diagrammatic drawings of units.

Mayonnaise Mixers—Bulletin 723, prepared by Pfaudler Company, Rochester, N. Y., is an illustrated leaflet devoted to equipment used in the manufacture of mayonnaise.

Watthour and Demand Meters—In the bound booklet entitled "Registers of Revenue" and designated as P-1753-B, the Westinghouse Electric & Manufacturing Company, Newark, N. J. describes and illustrates registering and recording electric meters.

Water Cooling Units for Bottlers—York Ice Machinery Corporation, York, Pa., describes and illustrates its automatic water-cooling equipment in an 8-page booklet known as Bulletin No. 30163.

Polyphase Motors—Squirrel-cage induction polyphase motors manufactured by the Century Electric Company, St. Louis, Mo., are specified in detail in a series of loose-leaf catalog sheets now available.

Power Pumps—In a 44-page booklet known as D-423-B1 the Worthington Pump & Machinery Corporation, 2 Park Ave., New York, N. Y., illustrates and gives detailed specifications describing its vertical triplex power pumps.

Recipes—A series of attractively bound small booklets containing full recipes for the preparation of a large number of desserts, sauces, and other food preparations has been prepared by the Crown Cork & Steel Company, Baltimore, Md.

NEWS OF THE MONTH

Health Claims on Foods To Get Closer Check

By Paul Wooton
Washington Correspondent

A SUBSTANTIAL part of the additional appropriation of $181,000 for the administration of the Federal Food and Drug Act will be used to investigate the health claims that are made by various food products. This announcement was made by officials of the Department of Agriculture in anticipation of the availability of the appropriation at the beginning of the next fiscal year, on June 30.

It will be necessary to use a large part of the increased appropriation for the provision of laboratory facilities. The balance will be used for new personnel. To some extent, the increased personnel will make it possible for the food and drug section to give greater attention to requests by food manufacturers for advance conferences on labeling problems. A welcome hand always has been extended to manufacturers who want to look before they leap, but the limited staff of the division has heretofore precluded the holding of a great number of conferences with individual manufacturers.

As soon as the standards committee has issued a definition of tomato juice, laboratory work will be started to check the commercial products now on the market. The recent increase in the number of tomato juice preparations on the market has aroused the interest of officials of the division. So far, however, the administration of the act has been confined to suppressing extravagant claims as to health value that have been found on some of the labels. Although a tentative decision has been reached, some doubt remains as to whether the standards committee will decree the product to be the filtered juice, the sedimented juice, or the strained whole tomato.

Administrative steps also are being taken against certain orange juice products. Under the standards set up by the department, products labeled as orange juice must contain nothing besides the extracted juice of the fruit. No dilution or addition is permitted. Despite the warnings that have been issued, a number of violations have been reported.

While the Department of Agriculture is concerning itself with the manufacturing and processing of tomato juice, the foodstuffs division of the Commerce Department is about to launch a survey dealing with the distribution of the product. Questionnaire blanks will be sent to some hundred or so manufacturers of tomato juice and tomato cocktail for the purpose of obtaining information on container sizes, production trends, and distribution methods. Production figures over a three-year period will be compiled. It is believed that the survey may check some evidences that have been noted toward overproduction of the product.

COMING EVENTS

APRIL

March 30-April 3—American Chemical Society, Indianapolis, Ind.
19-26—Amsterdam Confectionery Exposition, Amsterdam, Holland.
13-14—Bakery Sales Promotion Association, Fort Pitt Hotel, Pittsburgh, Pa.
14-15—National Pecan Marketing Association, Jackson, Miss.
22-23—American Dry Milk Institute, Bismark Hotel, Chicago, Ill.

MAY

6-8—American Society of Refrigerating Engineers, Kansas City, Mo.
7—National Cheese Institute, Inc., Schroeder Hotel, Milwaukee, Wis.
14-15—American Oil Chemists' Society, New Orleans, La.
18-20—National Cottonseed Products Association, Roosevelt Hotel, New Orleans, La.
18-21—American Association of Cereal Chemists, Brown Hotel, Louisville, Ky.
19-21—First Packaging Exposition (Consumer Marketing Division of American Management Association), Hotel Pennsylvania, New York City.

JUNE

2-5—National Confectioners' Association, Stevens Hotel, Chicago, Ill.

Fresh Cream Substitute Developed in Denmark

AN EMULSION of milk with edible vegetable oil corresponding to the fatty content of ordinary cream is now being marketed as a substitute for fresh cream by four Danish firms, according to the U. S. Department of Commerce. The new product is sterilized and sold in hermetically sealed tins under the names "Credin" and "Malga" and in bottles under the name "Milco."

The product is made in two consistencies, a low fat content for coffee and fruit dishes, and a higher fat content for whipping purposes. During the few months since the manufacture of the product was begun, it has found a ready market in Denmark, according to the report.

Ban on Frozen Package Meats Proposed in Maryland

A CLAUSE stating that "it shall be unlawful to sell or offer for sale any frozen package meats consisting of beef, veal, lamb, and pork ready for cooking and consumption" has been added as a rider to a cold-storage bill introduced in the Maryland State Senate. The main section of the bill to which it has been added proposes an amendment to the state health law requiring marking of all cold-storage foods.

At a hearing before the Committee on Sanitary Conditions of State on March 17, a delegation that overflowed the Senate chamber, led by the Retail Meat Dealers' Association of Maryland, urged favorable action on the clause. Claiming that sale of the frozen meat meant opening local markets to a cheap grade of Western meat, George Stroh, president of the meat dealers' group, called it a blow to industry that would aggravate unemployment. William Funk, president of the Retail Grocers' Association, and Henry F. Broening, president of the Maryland Federation of Labor, supported his stand.

Opinions that the proposal is obviously unconstitutional have led to moves for a less drastic proposal that would make it necessary for such products to be plainly labeled "frozen," but would not prohibit their sale. Concerted opposition on the part of those interested in the frozen food industry is expected to obviate any possibility of the original discriminatory clause receiving favorable action.

Food Companies Spent Most For Radio Broadcasts

RADIO advertising of foods and food beverages cost a total of over $5,000,000 last year, greater than for any other group of industries, according to a compilation by *Trends and Indications*. The expenditures of food manufacturers in 1930 were more than two and one-half times those made in 1929, the study reveals. An additional increase from $563,984 in 1929 to $839,070 in 1930 is shown in the separate "Confectionery and Soft Drinks" classification.

Second place in 1930 went to makers of drugs and toilet goods, who spent about $2,000,000 in this form of advertising. In 1929, the food manufacturing group was in second place, being exceeded by manufacturers of radios, phonographs, and musical instruments.

Product Variety Urged by Bakery Engineers

CONSIDERATION of greater variety for the products of wholesale bakers can be regarded as the theme of the eighth annual convention of the American Society of Bakery Engineers, held in Chicago, Ill., March 16 to 19. In this connection, President Louis E. Caster told the attending 534 members that the day of standardized bread business for the wholesale baker is past, and that careful thought must be given to production of diversified products.

Although considerable time was given to consideration of the various types of white breads and rolls, the greater portion of the four-day convention was taken up with such specials as yeast-raised sweet goods, rye and whole-wheat breads, cakes, cookies, and doughnuts. Sessions devoted to each of these products were led by a chairman recognized as an authority in the particular field, and all papers of each session were read by specialists on the topic under consideration. In addition to general subject papers, these sessions included papers devoted to equipment, cost control, formula building and explanation, bakeshop operations, and raw-material selection. Each paper was followed by an open forum discussion.

As evidence of prolonged interest in subjects other than routine production of a standard product the society authorized the appointment of a research committee, naming as chairman I. A. Berg, of the Portsmouth Cotton Oil Refining Corporation, Portsmouth, Va. This research committee is charged with investigating bread and cake as finished products, and sugar, shortening, butter, eggs, milk, and cake flour as raw materials.

Fostering a closer relationship between the commercial users and the producers of flour, the American Society of Bakery Engineers held a conference session with the American Association of Cereal Chemists on Monday afternoon, March 16, and appointed a special committee on a program for the Cereal Chemists' convention, which is to be held in Louisville, Ky., May 18-21.

The cereal chemists devoted their time to the consideration of such subjects as selection of wheat, preparation of wheat for milling, flour mill control, and "building" of flours. C. G. Harrel, Commander-Larabee Corporation, Minneapolis, Minn., illustrated how short patent flours can be influenced by selection of flour streams during milling to give desired variations in fermentation time, loaf volume, resistance to oxidizing agents, response to mechanical handling, and crumb flour.

Much interest was shown in the cracked wheat products so popular on the Pacific coast and in the development of doughnuts, which for the first time had an official place on the program of a convention of bakery engineers. Slicing of rye and pullman breads, as well as the production of twisted breads, gave rise to considerable discussion.

Officers for the coming year are as follows: president, Ross E. Anderson, Western Bakeries Corporation, Los Angeles, Calif.; first vice-president, Earl A. Cox, Cox Baking Company, Jamaica, N. Y.; second vice-president, Peter G. Pirrie, *Bakers Weekly*, New York City; secretary-treasurer, Victor E. Marx, *Bakers' Helper*, Chicago, Ill.

Food Prices Follow Trend Of Business Conditions

True to indications shown by the 3-per cent decline in *The Business Week* index of general business conditions for the month ending Feb. 15, wholesale food prices declined 3.75 per cent. Average decline for all commodities during the month was 1.95 per cent. This makes a total decline of 19.27 per cent in wholesale food prices for the 12-month period, against an 18-per cent total decrease for all commodities.

Retail prices of food declined 4⅓ per cent, in comparison with 3 per cent for the month ending Jan. 15. The total decline for 12 months ending Feb. 15 was 17 per cent, in comparison with 14½ per cent for the year ending Jan. 15. The decline in wholesale food prices is still greater than that of the retail prices by 2.27 per cent for the year. On Jan. 15, the difference was 3.09 per cent.

A reported increase of 10.72 per cent in tonnage of food sold during the month of February showed a decrease of 4.99 per cent in dollar sales as compared with February, 1930.

Employment and payroll comparisons give the food industries an adverse rating when compared with the average of all manufacturing industries for the month of February, but an exceptionally good rating for the 12-month period. For the month of February, the employee personnel in the food industries decreased 0.78 per cent, while that of all manufacturing industries increased 1.37 per cent. During the year ending March 1 the food industrial personnel decreased only 7.56 per cent, in comparison with a total average decrease of 17.94 per cent in all manufacturing industries.

Food payroll total decreased 1.76 per cent, against an average increase of 7.54 per cent in all industries for the month. For the year ending March 1 the food payroll total decreased 9.8 per cent, whereas that of all manufacturing industries declined 26.13 per cent.

As this issue of FOOD INDUSTRIES goes to press, *The Business Week* index has risen to 81 per cent of normal from the 78.2 per cent reported in the March issue of FOOD INDUSTRIES.

Discuss Milk Oversupply In New York Area

EFFECT of business conditions on the consumption of fluid milk in the New York City area, although not subject to strict analysis, because of divergent statistics, proved a topic of intense interest at a meeting of the New York Food Marketing Research Council on March 20. According to Fred H. Sexhaur, president of the Dairymen's League Co-operative Association, which supplies the greater part of the milk going to the metropolitan area, there has been a decline of from 40,000 to 50,000 cans per week in the past year. The limitations to elasticity of supply placed upon the dairy industry by nature make the situation particularly unfortunate, he pointed out, because a milk shortage several years ago led to large investments in well-planned expansion, based on probable market growth, among the 45,000 organized producers in the co-operative. Just at the time this expansion came to fruition, raising production about 8 lb. per day per dairy, the reduction in demand came about. Nevertheless, he said, the league is making every effort to see that the unsatisfactory economic conditions do not lower the quality of the milk.

The percentage drop in milk receipts in the New York area for January, 1931, compared to January, 1929, was shown by federal figures to be 7.5 per cent. Other figures, however, show a decrease of 3.3 per cent. The federal figures probably exaggerate the decline, according to Harry A. Ross, of Borden's Farm Products Company, because they include only rail shipments. In the last two years, the proportion of milk shipped by truck has increased considerably, he said.

By charts showing milk and cream consumption for the last half century, Mr. Ross showed that there was no definite correlation between periods of depression and decrease in milk consumption except in the present case. Strangely enough, consumption of cream, which in the past has declined considerably in periods of depression, increased 10 per cent in the past year.

In terms of milk equivalents, and considering growth of truck receipts, the receipts of milk and cream have not fallen seriously as a result of the depression, he pointed out. The serious situation which now exists has resulted from a combination of a small decrease in consumption and a 4,000-can-per-day increase in supply planned to meet a demand which failed to materialize, coinciding with a 10,000-can-per-day seasonal oversupply that ordinarily exists at this time of year.

L. A. Van Bomel, president of Sheffield Farms Company, Inc., outlined efforts under way to obtain greater milk consumption in the New York area. Shirley W. Wynne, Health Commissioner of New York City, urged concentration on consumption of milk by adults to raise milk consumption.

California Canners' League Emphasizes Distribution

ALTHOUGH the technical side of the canning industry was not neglected at the annual convention of the Canners' League of California, held Feb. 26-28, at Del Monte, Calif., the canners placed emphasis on efficient distribution. C. E. Hume, past president of the National Canners' Association, told the canners that they should not consider they had the "God-given right to fill every can they could lay their hands on and then expect to find a market for it." He pointed out that wholesale grocers had millions of dollars in the bank which should be in the hands of canners, simply because the grocers had lost confidence in the canners' ability to maintain a stabilized market.

On the other side of the matter, B. H. Critchfield, marketing expert for the Canners' League, reported that results of a survey among wholesale grocers in a number of Eastern marketing centers showed a steady growth in demand for California canned peaches. Sales of this were greater in many places in 1930 than they had ever been before. Mr. Critchfield, however, corroborated Mr. Hume's remarks by saying that many wholesale grocers were wary of buying, because they had no assurance that the prices of canned foods would remain stable.

Dr. H. R. Wellman, of the Giannini Foundation for Agricultural Economics at the University of California, gave a report on a statistical study that he is making of the canned peach situation. He showed that the trend of production of canning peaches points to a maximum about 1932, followed by a gradual decrease in quantity until 1938, when the trends of demand and supply will become about equal.

As usual, the sample cuttings were one of the features of the meeting. Fruit for salads, apricots, peaches, pears, and Royal Anne cherries were displayed. It seemed to be the general consensus of opinion that the quality of the 1930 pack was much superior to that of the year before.

Dr. K. F. Meyer, of the Hooper Foundation of the University of California, gave a very interesting talk on the present status of botulinus poisoning. Since 1899 there have been 130 outbreaks of botulism due to home preserved food products and 43 due to commercially canned products. The outbreaks increased in number from 1899 up to 1922, in which year there were 23. There has been no outbreak due to commercially canned foods since 1925, except one case in 1929, due to imported canned Italian onions.

All the existing officers of the Canners' League were re-elected at the meeting with the exception of the treasurer, R. R. Bellingall, who has retired from the canning business. Mr. Bellingall's position was filled by G. S. Lackie. These two new directors also were elected: H. G. Maxson, of the F. E. Booth Company, Inc., and E. Powers, of the Manteca Canning Company.

Consent Decree Ruling Will Be Appealed

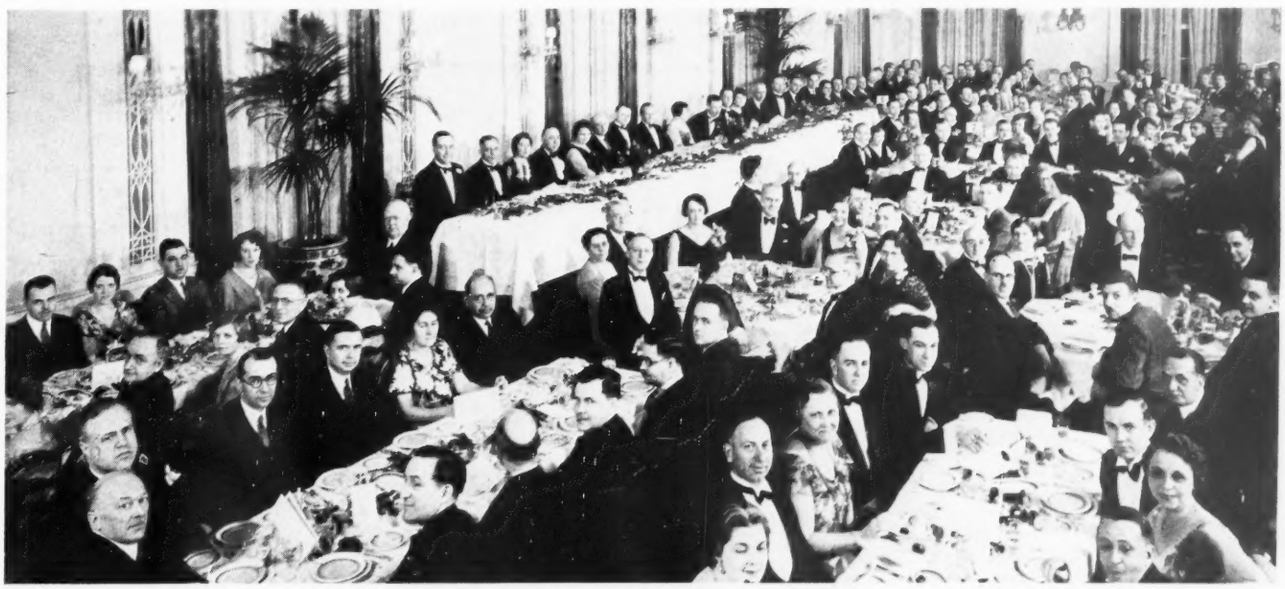
MODIFICATION of the packers' consent decree will be placed once more in the maze of litigation from which it temporarily emerged a few months ago after ten years of struggle, as a result of authorization of appeal to the Supreme Court announced on March 24 by Thomas Day Thacher, the Solicitor General.

The decision of the District Supreme Court, handed down by Justice Jennings Bailey on Jan. 5, granted the "Big Four" meat packers the right to extend wholesale operations to unrelated lines.

Decision to appeal was announced by the American Wholesale Grocers' Association about a month ago, but its plans were held in abeyance until the decision of the Department of Justice as to the possibility of appeal on the part of the Attorney General's office was made known. Because acceptance of the decision might establish the principle that anti-trust laws, under which the decree was originally invoked, are subject to continued modification in the courts with changes in general economic conditions, the department saw the necessity for continuing the action.

If the government had not decided to contest the modification, enactment of legislation to forestall its effects would have been attempted in Congress.

Due to the time necessary for legal preliminaries, the appeal will not be heard before the Supreme Court until after the summer recess.



Frozen Foods Served to Refrigerating Engineers

Members of the New York section of the American Society of Refrigerating Engineers and their wives appraised the present status of frozen foods for themselves at a dinner held March 18 at the Governor Clinton Hotel, New York City.

Opportunity to sample the frozen orange juice which National Dairy Products Corporation will distribute in the metropolitan area was one of the features of the menu. Fish steaks frozen by Atlantic Coast Fisheries Company; chicken frozen by General Foods Company; fruits frozen by Libby, McNeill & Libby, Fruit Machinery Corporation, and Tom Huston Frozen Foods, Inc.; and vegetables frozen by H. C. Hemingway & Company also were served.

Addresses stressing present problems and future possibilities of the industry were made by Clarence Birdseye, of General Seafoods Company; C. H. Robinson, distribution manager of Atlantic Coast Fisheries Company; and others prominent in the industry. William Fellowes Morgan, Jr., president of Brooklyn Bridge Freezing & Cold Storage Company, was toastmaster at the dinner.

Test Citrus Fruit Storage in Inert Gas

A LARGE-SCALE experiment to preserve citrus fruit in gas is being conducted at Howey-in-the-Hills, Fla. Although gas storage of such fruits has been attempted many times up to date, without marked success, W. J. Howey, developer of the huge citrus project bearing his name, has backed an industrial experiment which will test out the invention of John F. Rudd, of Atlanta, Ga.

Mr. Howey declined to give any technical details to a representative of FOOD INDUSTRIES, but preferred to discuss the probable economic effects of the method should it prove a success.

It appears that the plan involves the storage in an inert gas—perhaps carbon dioxide. Each of the three tanks, about 60x8 ft., will contain about 1,000 field boxes of oranges, or roughly three carloads. They are to be filled the last week of March, evacuated, and filled with the unnamed gas. It is planned to open the tanks next August.

Chemists familiar with citrus fruits state that the fruit will remain merchantable only eight to ten weeks under CO_2 storage without refrigeration and that enzyme action will by that time have proceeded to so great a degree that the oranges will be markedly deteriorated, although their external appearance may be perfect. In the absence of oxygen there is little likelihood that molding will occur, but enzymatic deterioration is considered to be the vital factor.

Flour Production for 1930 Announced; Further Distribution Census Reports

A TOTAL of more than 525,000,000 bushels of wheat was ground last year in United States in mills that normally manufacture 5,000 barrels of flour or more per year, according to census figures recently made public by the Department of Commerce. Of the total quantity of flour produced (113,805,737 barrels), Minnesota produced 16.3 per cent; Kansas, 15.2 per cent; New York, 11.8 per cent, and Missouri, 8.6 per cent. The average number of pounds of wheat used per barrel of flour produced was 276.9.

A summary of the census data by states is shown in the table below.

Preliminary data on the channels of trade through which biscuits and crackers, and flavoring syrups and extracts, are marketed, as revealed in the 1929 distribution census, have also been released. The figures are presented in tabular form below:

State	Average Number of Mills Reporting	Wheat Ground (Bushels)	Production Wheat Flour (Barrels)	Average Daily 24-Hour Capacity in Wheat Flour (Barrels)
United States	1,034	525,126,001	113,805,737	648,027
Minnesota	63	86,628,098	18,504,738	100,619
Kansas	105	80,122,813	17,317,886	94,108
New York	41	61,928,897	13,422,169	54,809
Missouri	69	44,979,756	9,799,496	55,082
Texas	37	23,984,512	5,264,942	32,989
Illinois	46	23,918,891	5,193,591	34,740
Washington	24	20,984,914	4,700,378	25,626
Oklahoma	28	18,719,991	4,053,562	19,972
Ohio	66	17,798,084	3,890,244	24,181
Nebraska	41	14,971,006	3,208,160	16,773
Oregon	23	12,629,447	2,848,604	17,680
Indiana	49	13,832,118	2,841,569	19,097
California	13	8,776,466	1,941,357	9,124
Iowa	14	8,651,989	1,879,093	9,020
Michigan	38	8,666,939	1,797,524	12,011
Colorado	21	7,809,098	1,740,616	9,267
Montana	16	7,715,992	1,737,866	9,747
Tennessee	34	7,849,679	1,684,655	14,746
Utah	20	7,136,476	1,580,115	8,267
Kentucky	33	6,559,954	1,437,962	10,785
Pennsylvania	71	6,729,531	1,436,893	11,654
North Dakota	13	6,018,337	1,301,225	9,821
Wisconsin	9	5,555,965	1,193,457	7,770
North Carolina	33	5,266,763	1,134,127	7,961
Virginia	44	4,953,338	1,066,944	8,193
Idaho	20	3,170,798	706,460	5,495
Maryland	19	2,875,141	623,017	5,484
South Dakota	10	870,782	178,580	2,427
All other[1]	34	6,020,136	1,320,507	10,579

[1] Includes Alabama, 1 mill; Arizona, 5; Arkansas, 3; Delaware, 1; District of Columbia, 1; Georgia, 5; New Hampshire, 1; New Jersey, 2; New Mexico, 3; South Carolina, 2; West Virginia, 5; and Wyoming, 5.

Sales of Biscuit and Crackers, 1929

	Selling Value (F.O.B. Factory)	Percentage of Sales	Number of Plants
Total	$276,130,000	100	*369
Sales to manufacturers' own wholesale branches†	148,887,000	53.9	97
Sales from factories:			
To dealers—			
Retailers	94,945,000	34.4	246
Wholesalers	22,176,000	8	137
Manufacturers' own retail branches	8,449,000	3.1	19
To users—			
Hotels, restaurants, etc.	1,079,000	0.4	32
Household	594,000	0.2	34
Volume of above sales made from factories through manufacturers' agents, selling agents, brokers, and commission houses†	6,810,000	2.5	46

*The total number of establishments engaged primarily in the manufacture of biscuit and crackers is 369. Inasmuch as some establishments sell to more than one type of customer, this figure is less than the total of the figures shown below.

†This report does not cover the sales by manufacturers' own wholesale branches to retailers, wholesalers, to manufacturers' own retail branches, and to hotels, restaurants, etc., nor does it cover the sales by these branches through manufacturers' agents, selling agents, brokers, and commission houses.

Sales of Flavoring Extracts and Flavoring Syrups, 1929

	Selling Value (F.O.B. Factory)	Percentage of Sales	Number of Plants
Total	$128,472,000	100	567
Sales to manufacturers' own wholesale branches†	9,797,000	7.6	48
Sales from factories:			
To dealers—			
Wholesalers	81,198,000	63.2	220
Retailers	17,663,000	13.8	260
Manufacturers' own retail branches	4,897,000	3.8	37
To consumers—			
Industrial	12,684,000	9.9	139
Household	2,233,000	1.7	91

†The total sales made from factories amounted to $118,675,000. Of this total, 16.1 per cent. or $19,089,000, was made through manufacturers' agents, selling agents, brokers, and commission houses.

Sales by Manufacturers Who Make Only Malt Extract and Malt Syrup, 1929

	Selling Value (F.O.B. Factory)	Percentage of Sales	Number of Plants
Total sales of Malt Extract and Malt Syrup	$32,281,864	....	...
Total sales by manufacturers who make only Malt Extract and Malt Syrup	10,306,000	100	32*
Sales to wholesalers' and manufacturers' own wholesale branches	8,684,000	84.3	20
Sales to retailers	740,000	7.2	11
Sales to industrial consumers	310,000	3	3
Sales to household consumers	572,000	5.5	14
Volume of above sales made through manufacturers' agents, selling agents, brokers, and commission houses	461,000	4.4	3

*Inasmuch as some establishments sell to more than one type of customer, this total is less than the total of the figures shown below.

†This report does not cover the sales by manufacturers' own wholesale branches to wholesalers, to retailers, to manufacturers' own retail branches, and to industrial consumers, nor does it cover the sales by these branches through manufacturers' agents, brokers, and commission houses.

Canned Tomatoes, Cherries, and Apricots Are Given Tentative Standards

FEDERAL standards under the Mapes amendment for canned tomatoes, cherries, and apricots were announced by the Food and Drug Administration on March 11. Public hearings on the standards will be held in Washington on April 13 and in San Francisco on April 14. Standards are complete except for the color requirement for canned tomatoes, but it is possible that they will be considerably altered after the hearings, as was the case with those for canned peas, peaches, and pears. The latter group will go into effect on May 18, having been officially approved last month.

Written comments on the suggested standards will be given consideration in making the final decisions if received before the date of the public hearings, the administration has announced. It is hoped that the new standards can be promulgated in final form by May 1, in order that the tomato standard will become effective Aug. 1, in time for the 1931 pack. The tentative requirements are as follows:

Canned Apricots

STANDARD

Canned apricots are the normally flavored and normally colored canned food consisting of (1) the normal- and uniform-sized, tender, unpeeled, mature, unblemished, pitted, unbroken halves of the fruit of the apricot tree, and (2) sugar solution.

The weight of fruit in the container is not less than two-thirds the weight of water which the sealed container will hold at 68 deg. F., except that, when necessary to prevent crushing of the fruit, a tolerance not exceeding the weight of one average piece is allowed. The liquid portion of the finished product reads not less than 16 deg. Brix (read at the proper temperature for the instrument used).

MEANING OF TERMS

The term "normally colored," as it relates to the fruit, means a general effect of yellow.

Units of one-third of an ounce or larger are considered of normal size.

The units shall be considered uniform in size if the transverse diameter of any unit does not vary more than 25 per cent from the corresponding average diameter of the pieces of fruit in the container.

The fruit shall be considered tender when the flesh of not less than 80 per cent of the units by count is completely perforated by a cylindrical rod, $\frac{1}{16}$ in. in diameter, under a load of 300 grams (approximately 10.6 oz.), applied vertically to the exposed, peeled surface of a test piece carefully placed on an appropriate support. In performing this test, the rod is placed on the exposed surface under an initial load of 100 grams and the load increased at a uniform, continuous rate of 12 grams per second until the piece is perforated. The test piece is conveniently supported on a rigid convex surface of such curvature as to fit into the seed cavity and permit it to maintain its normal shape. The peel is conveniently removed with pointed, sharp scissors.

The fruit shall be considered unblemished if 80 per cent or more of the pieces in the container are free from scabs, bruises, frost bites, sunburn, hail injury, green or brown colorations, or other unsightly blemishes.

The fruit shall be considered as unbroken halves when 80 per cent or more of the units are unbroken and not excessively trimmed. Excessive trimming is defined as that amount which destroys the normal shape of the half.

The weight of the fruit in the container means the fruit material in both the solid and liquid components. It is thus equivalent to the "put-in weight."

SUBSTANDARD DESIGNATION[1]

Canned apricots which fail to meet the above standard shall, except as hereinafter provided, bear the legend for low quality promulgated by the Secretary of Agriculture.

EXCEPTIONS

Canned apricots which fail to meet the above standard only in that they consist of apricots packed in water, need not bear the low quality legend if labeled "water-pack apricots." Canned apricots which fail to meet the above standard only in that the halves are peeled, need not bear the low quality legend if labeled "peeled apricots."

Canned apricots which fail to meet the above standard only in that they consist of unpeeled, whole apricots, need not bear the low quality legend if labeled "whole apricots," even though the units may fail to meet the requirement for normal size.

Canned Cherries

STANDARD

Canned cherries are the normally flavored and normally colored canned food consisting of (1) the normal- and uniform-sized, fleshy, mature, unblemished, stemmed, whole fruit of the cherry tree and (2) sugar solution.

The weight of fruit in the container is not less than three-fifths the weight of water which the sealed container will hold at 68 deg. F., except that when necessary to prevent crushing of the fruit a tolerance not exceeding the combined weight of three average units is allowed. The liquid portion of the finished product reads not less than 16 deg. Brix (read at the proper temperature for the instrument used).

TOLERANCES AND MEANING OF TERMS

The fruit shall be considered normally colored if the general color of the flesh be yellowish white.

Units of one-tenth of an ounce or larger are considered of normal size.

The cherries shall be considered uniform in size if 80 per cent of the units will pass through a circular opening 25 per cent larger in diameter than that through which the smallest unit will pass.

The fruit shall be considered fleshy if the flesh of the drained cherries is 88 per cent or more of their total weight.

The fruit shall be considered unblemished if 80 per cent or more of the units in the container are free from scabs, bruises, excessive cracks, or other unsightly blemishes. Cracks are considered excessive when their total combined length and width exceeds $\frac{1}{2}$ in., provided that checks in the stem depression and concentric with its sides shall not be considered excessive unless their maximum width exceeds $\frac{1}{4}$ in.

The weight of the fruit in the container is that of the fruit material in both the solid and liquid components and is thus equivalent to the "put-in weight."

SUBSTANDARD DESIGNATION[1]

Canned cherries which fail to meet the above standard shall, except as hereinafter provided, bear the legend for low quality promulgated by the Secretary of Agriculture.

EXCEPTIONS

Canned cherries which fail to meet the above standard only in that they consist of cherries packed in water need not bear the low quality legend if labeled "water-pack cherries."

Canned cherries which fail to meet the above standard only in that they consist of pitted whole cherries, and the number of pits in the can does not exceed 1 per cent of the total number of cherries present, need not bear the low quality legend if labeled "pitted cherries," even though the units may fail to meet the requirements for normal size and uniformity of size.

Canned cherries which fail to meet the above standard only in that the flesh is of some color other than yellowish white, as red sour cherries, Bing cherries, black cherries, et cetera, need not bear the low quality legend if labeled to show the type to which they belong.

[1]Later information has revealed that the form of label for substandard designation shown in the March, 1931, issue of FOOD INDUSTRIES (page 132) was erroneous in that the type was set in capital and lower case letters. The designations are to be set in all capital letters of the size and style specified. Correct form for the substandard label for cans under 1 lb., for example, is shown below:

BELOW U. S. STANDARD
LOW QUALITY BUT NOT ILLEGAL

Canned Tomatoes

STANDARD

Canned tomatoes are the normally flavored and normally colored canned food consisting of the peeled, cored and trimmed, whole or large pieces of the mature red fruit of the tomato vine (*Lycopersicon lycopersicum*), with or without the liquid which drains from an equivalent amount of the fruit during peeling, coring, trimming and packing, and with or without added seasoning (sugar, salt).

MEANING OF TERMS

The terms "normally colored" means a general effect of red, such that the homogeneous pulped and strained fruit shows a spectrophotometer reading of at least. [Yet to be decided.]

The fruit shall be considered as peeled when there are not more than 1.5 sq.in. of peel per pound of net contents.

The fruit shall be considered as trimmed when there is not more than one scar, brown or black colored area, or other unsightly blemish, per 8 oz. of net contents.

The fruit shall be considered as whole or in large pieces when at least 40 per cent of the total contents will be retained after draining for two minutes on a screen[2] having 2 meshes to the inch. On containers of less than 3 lb. net weight sieves 8 in. in diameter are used. On containers of 3 lb. net weight or more sieves 12 in. in diameter are used.

SUBSTANDARD DESIGNATION[1]

Canned tomatoes which fail to meet the above standard shall, except as hereinafter provided, bear the legend for low quality promulgated by the Secretary of Agriculture.

EXCEPTIONS

Canned tomatoes which fail to meet the above standard only in that they contain added pulped and strained tomatoes need not bear the low quality legend if labeled "tomatoes with added strained tomatoes."

[2]Wire of a uniform diameter, not less than 0.04 nor more than 0.07 in.

Reduce Tariff Rate on Edible Gelatine

IN response to an application from the Delft Gelatine Works, in the Netherlands, President Hoover has proclaimed a reduction in duty on edible gelatine valued at less than 40c. per pound, effective April 15. The compound rate for the future will be 5c. per pound and 12 per cent *ad valorem*, as against the duty of 5c. per pound and 20 per cent *ad valorem* imposed by the 1930 tariff act.

In its report to the President, the Tariff Commission stated that the reduction in the *ad valorem* rate is necessary to equalize production costs in the United States and in Holland. No change was recommended by the Commission for edible gelatine valued at 40c. or more per pound, but this is of minor importance.

The costs upon which the reduction in duty was based were not disclosed in the Commission's report to the President, as the Delft Gelatine Works is the only producer in the Netherlands. The excess of the cost of the domestic product over the Dutch product in 1929 was reported to be 7.8c. per pound, including transportation and delivery charges.

TRADE NOTES

ABRAHAM BROS. PACKING COMPANY, Memphis, Tenn., is preparing to add several new departments following the acquisition of the Beasley Packing Company, of Hollywood, a Memphis suburb.

AMERICAN FRUIT GROWERS, INC., emerged victorious in the action before the Supreme Court testing the validity of the Brogdex Company's patent on the use of borax solution for preserving fresh fruit. The court held that the patent (No. 1,529,461, issued to Ernest M. Brogden and Miles L. Trowbridge) was invalid, thus reversing the decisions of the two lower courts.

APPLIED SUGAR LABORATORIES, New York City, are making an exhaustive study of starches as used in the manufacture of confectionery. It is hoped that more satisfactory standards can be developed for this product.

BRECHT CANDY COMPANY, and W. C. Nevin Candy Company, both of Denver, Colo., have completed arrangements for a merger. The combined organization will be the largest confectionery company in the Rocky Mountain area.

CALIFORNIA AND HAWAIIAN SUGAR REFINING COMPANY, San Francisco, Calif., celebrated its twenty-fifth anniversary on March 10. Opening in March, 1906, the annual melt of its Crockett refinery has increased from 67,000 tons to 750,000 tons last year, making it the largest sugar refinery in the world. Representatives of thirteen other sugar refineries were present at the anniversary celebration.

CARBICE CORPORATION OF AMERICA has been absolved of patent infringements on methods of packaging involving the use of solid carbon dioxide. The Supreme Court of the United States recently dismissed the suit brought by the American Patents Development Corporation and DryIce Corporation of America. The patent owner, it was held by the court, could not secure a monopoly on the manufacture and sale of solid carbon dioxide, a material which is unpatentable, by such action. Although infringement might exist, should someone assemble the package, solid CO_2, and food in the manner covered by the patent, no action can be taken against manufacturers of the unpatentable materials which enter into this combination.

CONTINENTAL MARKETING CORPORATION, with offices in the Merchandise Mart, Chicago, Ill., has been formed to serve food manufacturers and voluntary chains in problems of marketing, sales development, and distribution.

CURTISS CANDY COMPANY, Chicago, Ill., has been ordered by the Federal Trade Commission to discontinue certain methods of maintaining resale prices on its products.

DAIRY & POULTRY CO-OPERATIVES, INC., has been recognized by the Federal Farm Board as a regional marketing organization for handling of dairy and poultry products, it was announced on March 12. Sales activities of co-operatives operating in sixteen states will be centralized through this new organization, with headquarters in Chicago. The member associations last year handled products valued at nearly $20,000,000 and represent approximately 100,000 producers, chiefly in the Middle West.

FRUIT GROWERS' CANNING COMPANY, Sturgeon Bay, Wis., has been acquired by the Fruit Growers' Union, a co-operative cherry marketing organization. The unified body will own and operate its own canning plant in Door County, Wis. A. W. Lawrence, head of the former canning company, was elected president of the new organization.

ADOLF GOBEL, INC., New York City, has selected as members of the executive committee Henry L. Batterman, Malcolm D. Hunter, Rodney Hitt, Henry Merkel, and Frank M. Firor, chairman and president of the Gobel concern. The executive committee has employed Stevenson, Jordan & Harrison as consulting management engineers.

GREAT LAKES FRUIT INDUSTRIES, INC., Benton Harbor, Mich., has been formed by the consolidation of ten large fruit co-operative organizations and two canning plants in western Michigan. The Federal Farm Board has agreed to construct additional canning facilities at Colma and Shelby, Mich.

HOLSUM PRODUCTS, INC., Milwaukee, Wis., has recently purchased a mustard manufacturing plant in St. Paul, Minn.

MEAD JOHNSON TERMINAL, Evansville, Ind., a $500,000 center which will co-ordinate water, rail, and truck shipments was formally opened on Feb. 27. E. Mead Johnson, president of Mead Johnson & Company, infant diet manufacturer, was personally responsible for construction of the terminal.

KOLB'S BAKERY, BALTIMORE, MD., has entered the dairy business, and will deliver milk as well as bread to homes and retail stores. This action is assumed to be a reprisal against the Fairfield-Western Maryland Dairy, which started its own bakery several months ago and has been delivering bread direct to the customer with its milk.

KROGER GROCERY & BAKING COMPANY, Cincinnati, Ohio, is making plans to establish lunch counters in a number of its stores, Albert H. Morrill, president, announced a few weeks ago.

LOOSE-WILES BISCUIT COMPANY has acquired the Schust Company, of Saginaw, Mich., through an exchange of stock. By this arrangement, Loose-Wiles obtains plants and branches in Detroit, Port Huron, Lansing, and Grand Rapids, Mich., and Toledo, Ohio. No change in management is contemplated.

MICHIGAN SUGAR COMPANY, Bay City, Mich., has announced that its eight plants in Michigan and one in Toledo, Ohio, will not operate this year. Under normal conditions, the plants use beet crops from 80,000 to 100,000 acres of Michigan soil and 12,000 acres of Ohio farm land.

MIRROR, New York City candy company, has filed suit in the Supreme Court against Loft, Inc., and Happiness Stores, Inc., complaining that, through acquisition of its stock, they had acted to "cripple, wreck, and destroy" its competing business. The Mirror was purchased by Happiness in June, 1927. When Loft purchased Happiness from the United Cigar chain last September, there was considerable confusion as to the control of the Mirror. Announcement that it had reverted to preferred stockholders was made last November.

NATIONAL DAIRY PRODUCTS CORPORATION, New York City, has begun distribution in Buffalo, N. Y., and Erie, Pa., of frozen orange juice produced by its subsidiary, National Juice Company, Tampa, Fla. Retail distribution of the pint and half-pint cartons is expected to begin in New York; New Haven, Conn.; and Cleveland, Ohio, within the next few days. Wholesale distribution in gallon cans has been begun in New York by Breakstone Brothers, another National Dairy subsidiary.

NIAGARA FRONTIER FOOD TERMINAL, Buffalo, N. Y., the nucleus of a huge food distributing center for this area, was formally opened a few weeks ago. The terminal represents an investment of $5,000,000.

PANTRY CREAM SALES CORPORATION, of Cleveland, Ohio, is introducing canned whipping cream in the Chicago area.

PARKER SALES CORPORATION has been chartered at Syracuse, N. Y., to establish and operate a plant for the manufacture and distribution of flour and cereal products.

PHILADELPHIA DAIRY PRODUCTS COMPANY has been granted an injunction against the Quaker Ice Cream Company, also of Philadelphia, prohibiting illegal efforts to induce customers to break their contracts with the plaintiff.

SWINSON & PRESSON COMPANY, Charlotte, N. C., has recently been organized to engage in the manufacture of peanut products.

WISCONSIN FIELD BROKERS' ASSOCIATION a section of the Wisconsin Canners' Association, has been formed by eight leading Wisconsin brokers to co-operate with the canners of the district in eliminating trade abuses.

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PERSONALS

F. M. DODDS has been made president of the new Atlanta (Ga.) warehouse of the United States Cold Storage Company. He also is president of the Kansas City branch. J. C. Irwin will be manager of the new Atlanta plant when it is completed.

E. VICTOR DONALDSON has been elected president of the Robert Gair Company. He formerly was vice-president and general manager.

MARIETTA EICHELBERGER, formerly director of the nutrition service for the Mid-Western branch of the American Red Cross, has been made director of nutrition service for the Evaporated Milk Association.

I. H. HOAGLAND, formerly general superintendent of Armour & Company, had been elected vice-president in charge of domestic sales and market operations, a new position. HARRY G. MILLS has been elected vice-president in charge of plant operations.

C. H. HOWELL, formerly of Montreal, Que., has been elected vice-president of the Kraft-Phenix Cheese Corporation. In addition to acting as assistant to the president, he will have charge of foreign operations.

H. F. JUDKINS has been appointed production manager of the National Dairy Products Corporation, New York City. Formerly, Mr. Judkins was connected with the General Ice Cream Company, Schenectady, N. Y., a National Dairy subsidiary. He is recognized as an authority in the ice cream industry, and is at present chairman of the research committee of the International Association of Ice Cream Manufacturers.

G. A. MEISNER, Wittenberg, Wis., has been re-elected president of the Wisconsin Bottlers of Carbonated Beverages.

ARTHUR M. ROSE, district manager for the Kroger Grocery & Baking Company at Peoria, Ill., has been put in charge of the Indianapolis territory.

JACOB SCHAFFNER has been elected president of the Schaffner Brothers Company, Erie, Pa., meat packers, succeeding the late Morris Schaffner.

C. H. WEBER, head of C. H. Weber Company, honey packer, before it was absorbed by Preserves & Honey, Inc., is now associated with W. F. Straub Laboratories, Inc., Chicago, Ill., as director of honey sales.

DANIEL P. WOOLLEY, vice-president of Standard Brands, Inc., in charge of advertising, has also been put in charge of sales for the organization. Mr. Woolley began his career with the Fleischmann Company 22 years ago wrapping yeast cakes in tinfoil in the Cincinnati plant.

OBITUARY

S. A. W. CARVER, organizer of the Crescent Creamery Company, Los Angeles, Calif., which was merged with Western Dairies several years ago, died recently after an extended illness.

J. H. HOWE, secretary of Dodge & Olcott Company, New York City, flavoring extract manufacturers, died March 17 after a brief illness. Mr. Howe, who was 68 years of age, had been connected with this organization for 48 years.

J. B. MCLEMORE, president of the Red Band Milling Company, Johnson City, Tenn., died several weeks ago. Mr. McLemore was organizer of the Soft Wheat Millers' Association of America, and served as its executive secretary for fifteen years.

ALBERT MAURICE NICHOLS, manager of the Cudahy Packing Company plant at San Diego, Calif., died March 13, following an acute attack of appendicitis. He had been district manager of the Cudahy plant in Salt Lake City, Utah, for about twelve years and went to San Diego in June, 1930.

ANTHONY PFLAUMER, Chicago, Ill., for 25 years Western district supervisor for the Ward Baking Company, died on March 18 at the age of 51. For the last four years he was connected with the Paul Baking Company, Chicago.

JOHN B. THOMY, formerly head of Preserves and Honey, Inc., Brooklyn, N. Y., died suddenly in Chicago, Ill., on March 10. He had lately been associated with Candy Brands, Inc.

JACK H. WELCOME, secretary of National Miller Publications, Inc., publishers of *National Miller*, died suddenly on Feb. 23. He was 40 years old.

NEW CONSTRUCTION

Bakery—Bauer Baking Co., K. E. Bauer, Pres., 7418 Tioga St., Pittsburgh, Pa., awarded contract for a 1 story, 32 x 105 ft. bakery to H. G. Dunlap, 236 St. Clair St., Pittsburgh. Estimated cost $40,000.

Bakery—J. Boruta, 103 Halstead St., Wallington, N. J., will receive bids until Apr. 6 for a 2 story, 75 x 75 ft. bakery, garage, etc., at Mercer St. and Wallington Ave. Estimated cost $40,000. J. Camlet, 26 Piaget Ave., Clifton, is architect.

Bakery—Campbell-Taggart Associated Bakeries, 30th and Troost Sts., Kansas City, Mo., are having preliminary plans prepared for the construction of a bakery at Sioux City, Ia. Estimated cost $200,000.

Bakery—Cushman Baking Co., N. A. Cushman, 105 Elm St., Portland, Me., awarded contract for addition and alterations to bakery on Elm St. to Brown Construction Co., 574 A Congress St., Portland. Estimated cost $40,000.

Bakery—Dept. of Mental Hygiene, Municipal Bldg., New York, N. Y., will soon award contract for the construction of a bakery at Craig Colony for Epileptics, Sonyea. Estimated cost to exceed $40,000.

Bakery—Freihofer Baking Co., 359 East Merrill St., Indianapolis, Ind., awarded contract for improvements to bakery, to Brandt Bros., 611 Architects Bldg., Indianapolis. Estimated cost $40,000. New ovens will be required.

Bakery—Helms Bakeries Ltd., 8800 Venice Blvd., Los Angeles, Calif., awarded contract for a 1 and 2 story, 197 x 231 ft. bakery including refrigeration plant, boiler plant, loading platforms, etc. to Hamm, Grant & Bruner, 607 Ferguson Bldg., Los Angeles. Estimated cost $110,000.

Bakery—J. Myleck, 56 School St., Thompsonville, Conn., awarded contract for a 1 and 2 story, 50 x 100 ft. bakery on Church St. to Alessi Bros., 35 Memorial St., West Springfield, Mass. Estimated cost $40,000.

Bakery—National Biscuit Co., 449 West 14th St., New York, N. Y., plans the construction of a 1 and 2 story, 170 x 330 ft. bakery at Syracuse. Estimated cost $400,000. L. Wirsching, Jr., 449 West 14th St., New York, is architect. Maturity late in April: also plans a 3 story, 80 x 250 ft. bakery addition at Atlanta, Ga. $500,000.

Bakery—San Joaquin Baking Co., L. and Los Angeles Sts., Fresno, Calif., awarded contract for the construction of a 1 and 2 story bakery at 10th and Needham Sts., at Modesto to H. Tennyson, 125 Poplar St., Modesto. $50,000. Equipment to cost $15,000 will be installed.

Bakery—South Side Bakery Co., 915 South Meridian Ave., Indianapolis, Ind., will build a bakery. Estimated cost $40,000. Private plans. Work will be done by owners forces.

Bakery—A. Vella, 182 Remsen Ave., New Brunswick, N. J., will soon award contract for a 2 story bakery on Livingston Ave. Estimated cost $40,000. H. G. Bach, 63 Schureman St., New Brunswick, is architect.

Bakery Addition—Haller Baking Co., F. C. Haller, Pres., 204 North Denniston Ave., Pittsburgh, Pa., will soon award contract for a 3 story, 50 x 115 ft. bakery. P. R. Schueneman, Magee Bldg., Pittsburgh, is architect.

Bakery, Cold Storage Plant, Etc.—Dept. of Correction, State Office Bldg., Albany, N. Y., will soon award contract for bakery, storehouse, cold storage plant, etc., at New York State Reformatory for Girls at Bedford Hills. Estimated cost to exceed $40,000.

Bottling Plant—Coca Cola Bottling Works, 20 Roberts St., Bradford, Pa., is having revised plans prepared for the construction of a 1 and 2 story, 75 x 100 ft. bottling plant in McKean County. Estimated cost $40,000. Private plans.

Bottling Plant—Coca Cola Bottling Co., Beaumont, Tex., will soon start work on the construction of a bottling plant. Pringle & Smith, Norris Bldg., Atlanta, Ga., are architects. Work will be done by owner's forces. A. C. Johnson, in charge.

Bottling Plant—New York State c/o Saratoga Springs Commission, Albany, N. Y., is having revised sketches made for the construction of a mineral water bottling plant at Saratoga Springs. $300,000. Maturity late in April.

Bottling Plant—J. D. Stokely, First National Bank Bldg., Birmingham, Ala., manufacturer of soft drinks, will soon award contract for the construction of a 3 story, 60 x 128 ft. plant. Estimated cost $60,000. D. O. Whildin, 525 North 21st St., Birmingham, is architect.

Bottling Plant—Undina Beverage Co., B. A. Benson, V. Pres., Higganum, Conn., awarded contract for the construction of a 2 story, 75 x 125 ft. bottling plant to G. H. Birdsey, 2 Russell St., Middletown. Estimated cost $50,000.

Bottling Plant Addition—F. and M. Schaefer Brewing Co., Kent Ave. and 10th St., Brooklyn, N. Y., plans addition to bottling plant. Estimated cost $100,000. Waldemar Montenson, 103 Park Ave., New York, is architect. Maturity late in April.

Brewery—Northwest Brewing Co., Tacoma, Wash., will move plant from Walla Walla to Tacoma and will expend $75,000 in additional machinery and equipment.

Soda Water Plant—M. J. Cook, 235 Rose St., Newark, N. J., awarded contract for a 2 story addition to soda water plant to Levine Bros., 519 South 14th St., Newark. Estimated cost $40,000. New bottling machinery will be installed.

Candy Factory—Davenport Candy Co., 211 East Second St., Davenport, Ia., awarded contract for a 1 story, 60 x 200 ft. candy factory on Boise Ave. to John Soller Construction Co., Old Masonic Temple Bldg., Davenport. Estimated cost $40,000.

Canning Plant—Campbell Soup Co., Ltd., H. O., Camden, N. J., awarded contract for the construction of a canning plant at New Toronto, Ont. to Anglin-Norcross Ltd., Temple Bldg., Toronto. Estimated cost $300,000.

Canning Plant—Elmer Butterfield, Eaton, Ind., will build a canning plant. Estimated cost $40,000. Private plans. Work will be done by day labor.

Canning Plant—Reynolds Bros., Spurgeon Bay, Wis., plans the construction of a 2 story canning plant at Adams tract, Brownsville, Tex. Estimated cost $100,000.

Canning Plant (Vegetables and Citrus)—Walker Craig Co., c/o P. S. Dougherty, 507 Front St., Brownsville, Tex., will soon award contract for the construction of a canning plant at Harlingen. Private plans.

Creamery—G. R. Heath, 2930 Garber St., Berkeley, Calif., awarded contract for a 1 story creamery plant at San Pablo Ave. to E. H. Wendt, 2116 Allston Way, Berkeley. Estimated cost $75,000.

Creamery Plant—Louisiana Creamery Co., Inc., Baton Rouge, La., will soon award contract for the construction of a 2 story creamery plant including cold storage room, mechanical equipment, etc. Estimated cost $50,000. Weiss, Dreyfous & Seiferth, Maison Blanche Bldg., are engineers.

Dairy Plant Addition—Mitchell Dairy Co., 745 North Ave., Bridgeport, Conn., awarded contract for a 2 story, 78 x 80 ft. addition to dairy plant at Garland St. to Pardy Construction Co., 1481 Seaview Ave., Bridgeport. Estimated cost $50,000.

Dairy Plant—Otto Suburban Dairy, R. A. Otto, Camp Horne Rd., Emsworth, Pa., will soon award contract for a 1 and 2 story dairy plant including refrigeration system, etc. Estimated cost $40,000. Haggart & Culler, State Theatre Bldg., Pittsburgh, are architects.

Dairy Plant—Scholl Dairy Co., Michigan City, Ind., awarded contract for the construction of a 2 story, 101 x 150 ft. dairy plant, including bottling, receiving and pasteurizing departments, at 1030 East Michigan St. to Tonn & Blank, 93 North Franklin St., Michigan City. Estimated cost $60,000.

Dairy Plant—Southern Dairies Co., Inc., 14 East 7th St., Chattanooga, Tenn., will soon start work on the construction of a dairy plant on Dodson Ave. Estimated cost $100,000. Equipment will be required.

Dairy Plant—University of New Hampshire, Durham, N. H., plans the construction of a dairy plant. Estimated cost to exceed $40,000. E. T. Huddleston is supervising architect.

Milk Plant—T. Cooper, Ardmore, Okla., is having preliminary plans prepared for the construction of a milk plant. Estimated cost $25,000. Private plans.

Milk Plant—Roberts Dairy Co., Sioux City, Ia., will soon award contract for the construction of a 1 story powdered milk and pasteurized milk plant at West 9th and Omaha Sts. Estimated cost $100,000. G. B. Hilgers, United Bank Bldg., Sioux City, is architect.

Milk Receiving Plant—Kraft-Phoenix Cheese Co., Dale, Ind., awarded contract for the construction of a 55 x 110 ft. milk receiving plant to A. Ryan, Dale. Estimated cost $40,000. Private plans.

Pasteurizing Plant—Gaffney Bros., 625 Plantation St., Worcester, Mass., had plans prepared for the construction of a 40 x 40 ft. pasteurizing plant. H. L. Meacham, Associates, 120 Front St., Worcester, are engineers.

Cold Storage Plant Addition—California State Harbor Commission, San Francisco, Calif., received lowest bid for addition to cold storage plant at Channel and Third Sts. from C. D. DeVelbiss, 369 Pine St., San Francisco.

Cold Storage Plant—Decker Packing Co., E. S. Selby, Mgr., Mason City, Ia., is having plans prepared for the construction of cold storage and packing plants on Crockett St., Beaumont, Tex. Estimated cost $70,000 and $50,000 respectively. R. C. Heartfield, Goodhue Bldg., Beaumont, is architect.

Cold Storage Plant—Wilson Packing Co., Chicago, Ill., (meat packers) will soon award contract for the construction of a 2 story, 75 x 150 ft. cold storage plant at Beaumont, Tex. Estimated cost $100,000. Private plans.

Cold Storage Plant Addition—Bd. of Harbor Commissioners, Ferry Bldg., San Francisco, Calif., will soon award contract for addition to cold storage and refrigeration plant also installing machinery and equipment at Channel and 3rd Sts.

Ice Making Machine—Morrison Ice Co., 342 King St., Brockville, Ont., plans to purchase a 10-ton ice making machine.

Ice House—Fremont Fuel & Ice Co., 250 West 5th St., Fremont, Neb., will build a 1 story, 36 x 65 ft. ice house on Sixth St. Work will be done by day labor. Equipment to cost $45,000 will be required. Refrigeration machinery let to Bakery Ice Machine Co., 3601 North 16th St., Omaha.

Ice Manufacturing Plant—M. J. Uline, 1150 Third St. N. E., Washington, D. C., awarded contract for the construction of a 1 story, 100 x 200 ft. ice manufacturing plant to Consolidated Engineering Co., 20 East Franklin St., Baltimore, Md. Estimated cost $35,000.

Ice Manufacturing Plant—Williamsburgh Ice Co., 257 Ten Eyck St., Brooklyn, N. Y., awarded contract for addition and alterations to ice manufacturing plant at Ten Eyck St. and Bushwick Ave. to Cooling Tower Co., 15 John St., New York.

Ice Plant—E. A. Liebman, 1214 West 18th St., Oklahoma City, Okla., is having preliminary plans prepared for the construction of a raw water ice plant at Shawnee. Estimated cost $90,000. Private plans.

Ice Plant Addition—O. D. Dillingham, Abilene, Tex., has leased present ice plant at 411 Oakes St. and plans for purchase and installation of a 20-ton addition. Estimated cost $30,000. Private plans.

Ice Plant Equipment—Atlantic Ice & Coal Co., 816 4th Ave. No., Nashville, Tenn., plans installation of new machinery and equipment in plant. Estimated cost $25,000.

Pre-Cooling Plant—Anaheim Orange Association, c/o H. A. Hamm, 2145 Sacramento St., Los Angeles, Calif., is having plans prepared for the construction of a pre-cooling plant at Anaheim. Estimated cost $70,000.

Pre-Cooling Plant—Villa Park Orchards Association, Santa Ana, Calif., plans the construction of a 2 story pre-cooling plant. Estimated cost $75,000. Architect not selected.

Pre-Cooling Plant—Golden State Citrus Products Co., Anaheim, Calif., will soon award contract for the construction of a 1 story 55 x 105 ft. pre-cooling plant. Estimated cost $70,000. H. A. Hamm, 2145 Sacramento St., Los Angeles, is architect.

Refrigeration Plant—Dept. of Hospitals, Municipal Bldg., New York, N. Y., will receive bids about May 1 for the construction of a refrigeration plant at Randalls Island. Van Wart & Wein, 347 Madison Ave., New York, are architects.

Coffee Plant—Birdsey Flour Mills, S. Birdsey, Pres., Macon, Ga., plans the construction of a 2 story coffee plant on Poplar St.

Coffee Warehouse—Atchison, Topeka & Santa Fe Ry., 80 East Jackson Blvd., Chicago, Ill., awarded contract for a 2 story, 70 x 140 ft. coffee warehouse at 12th St., Oklahoma City, Okla., to C. M. Dunning, 605 North Hudson St., Oklahoma City. Estimated cost $70,000. G. W. Harris, Chicago, is chief engineer. Nash Finch Co., 320 West Second St., Oklahoma City, is lessee.

Fruit Handling and Cold Storage Plant—Norfolk Fruit Growers Assn., Simcoe, Ont., plans a 3 story addition to fruit handling and cold storage plant. Estimated cost $100,000. E. H. Darling, Pigott Bldg., Hamilton, is engineer.

Fruit Packing and Cold Storage Plant—Huron County Fruit Growers Association, Goderich, Ont., plans the construction of a 4 story fruit packing and cold storage plant. Estimated cost $100,000. E. H. Darling, 36 James St. S., Hamilton. Interested in prices on complete equipment.

Fruit Preserves Plant—Tea Garden Products Co., 3433 8th St., Seattle, Wash., awarded contract for the design and construction of a 3 story, 90 x 132 ft. plant for the manufacture of fruit preserves and jellies to The Austin Co., 16112 Euclid Ave., Cleveland, O. Estimated cost $250,000.

Packing Plant—American Fruit Growers Association, c/o L. E. Snavely, Harlingen, Tex., will soon award contract for the construction of a packing plant at Raymondville. Private plans.

Fruit Packing Plants (Citrus)—Texas Citrus Fruit Growers Association, Brownsville, Tex., plans the construction of citrus packing plants at Santa Rosa, Harlingen and Brownsville, also in Hidalgo County. Estimated cost $100,000 each.

Potato Chip Factory—Blue Bird Potato Chips, Inc., 68th Ave. and Beck St., Oakland, Calif., awarded contract for the construction of a 1 story factory on 81st Ave. to A. A. Haskell, 265 Ridgeway Ave., Oakland. $28,876.

Flour Mill—Washburn Crosby Co., Chamber of Commerce Bldg., Minneapolis, Minn., awarded masonry and carpentry contracts for a 3 story flour mill at 104th St. and Calumet Ave., Chicago, Ill., to Jacobsen Bros., 53 West Jackson Blvd., Chicago. Estimated cost $40,000.

Grain Elevator—Acme-Evans Co., 852 West Washington St., Indianapolis, Ind., awarded contract for the construction of a 50 x 80 ft. grain elevator to C. J. Wacker, 132 West 32nd St., Indianapolis.

Grain Elevator—Canada Malting Co., 5022 St. Ambroise St., Montreal, Que., awarded contract for the construction of a grain elevator, 600,000 bu. capacity to G. M. Cape & Co., 620 Cathcart St., Montreal. Estimated cost $200,000.

Grain Elevator—City of Junction City, Kan., plans the construction of a 250,000 bu. grain elevator, 40 x 111 ft. including eleven tanks and twenty-three bins. Estimated cost $50,000. Homer & Wyatt, 468 Bd. of Trade Bldg., Kansas City, Mo., are engineers.

Grain Elevator—Hogan Milling Co., Junction City, Kan., is having preliminary plans prepared for a 40 x 111 ft. grain elevator. Estimated cost $50,000. Horner & Wyatt, 468 Bd. of Trade Bldg., Kansas City, Mo., are engineers.

Grain Elevator—Midland Pacific Grain Co., Woolford, Alta., plans the construction of a grain elevator. Estimated cost $100,000.

Grain Elevator—Missouri-Kansas-Texas R.R., Railway Exchange Bldg., St. Louis, Mo., awarded contract for the construction of a grain elevator including head house, conveyor system, etc., 1,000,000 bu. capacity at Mill St. and Southwest Blvd., Kansas City, to James Stewart Corp., 343 South Dearborn St., Chicago, Ill. Estimated cost $250,000. F. Ringer, St. Louis, is chief engineer.

Grain Elevator—Missouri Pacific R.R., Missouri Pacific Bldg., 13th and Olive Sts., St. Louis, Mo., awarded contract for the superstructure of a 150 x 420 ft. grain elevator, 2,500,000 bu. capacity to S. Patti Construction Co., 705 Finance Bldg., Kansas City, also bins, etc. to Standard Steel Works, 16th and Howell Sts., Kansas City. Estimated total cost $1,000,000. E. A. Hadley, St. Louis, is chief engineer. Continental Export Co., Merchants Exchange Bldg., St. Louis, is lessee.

Grain Elevator—Searle Grain Co., 378 Grain Exchange Bldg., Winnipeg, Man., plans the construction of a grain elevator, 1,000,000 bu. capacity at Vancouver, B. C.

Grain Elevator—Wolcott & Lincoln, c/o Homer & Wyatt, 468 Bd. of Trade Bldg., Kansas City, Mo., engrs., are having plans prepared for the construction of a 40 x 226 ft. grain elevator, 500,000 bu. including grading, cleaning and conditioning equipment, terminal equipment, electric power, etc. Estimated cost $150,000.

Grain Elevator Addition—Fremont Mills Co., Fremont, Neb., awarded contract for addition to grain elevator, 130,000 bu. capacity to include six tanks, 100 ft. high to Burrell Engineering & Construction Co., 1 Canal St., Chicago, Ill. Estimated cost $40,000.

Grain Building—Regina Exhibition Association, Regina, Sask., awarded contract for the construction of a 120 x 640 ft. building for World's Grain Show to Carter-Halls-Andinger Co. Ltd., 510 West Hastings St., Vancouver, B. C. $179,469.

Mill and Grain Plant—T. A. McCoy, Liberty, Ind., will build a mill and grain plant. Estimated cost $40,000. Bacon & Tislow, Architects Bldg., Indianapolis, are architects. Work will be done by owner's forces.

Abbatoir Building—United Dressed Beef Co., 780 First Ave., New York, N. Y., awarded contract for addition and alterations to abbatoir building, slaughter house, etc., at Johnson Ave. and Gogart St. to Wiener & Levin Construction Co., 55 West 42nd St., New York. Estimated cost $40,000.

Packing Plant (Meat)—Alberta Co-Operative Livestock Producers, Ltd., Edmonton, Alta., plans the construction of a meat packing plant. Estimated cost $75,000.

Packing Plant Addition (Meat)—Buehler Bros., Inc., 1400 West 46th St., Chicago, Ill., has work under way on a 2 story, 84 x 100 ft. addition to packing plant at 1414-20 West 46th St. Estimated cost $100,000.

Packing Plant (Meat)—Swift & Co., Packers and Exchange Aves., Chicago, Ill. H. A. Hobbs, Savannah, Ga., Mgr., will soon receive bids for the construction of a warehouse at 309 West Broad St., Savannah.

Poultry Plant—Wickham-Havens, Inc., 1510 Franklin St., Oakland, Calif., is having plans prepared for the construction of first unit of poultry plant, including warehouses, administration building, etc., $75,000. Total cost $350,000. Private plans.

Packing Plant Addition—Waldock Packing Co. F. P. Waldock, Pres., Sandusky, O., is having preliminary plans prepared for a 2 story addition to packing plant. Estimated cost $40,000. Anders & Reimers, Columbia Bldg., Cleveland, are architects.

Packing Plant—Sugardale Provision Co., H. L. Levin, Pres., 1018 McKinley Ave., S.W., Canton, O., awarded contract for the construction of a packing plant to Boldt-Rapp Construction Co., 6007 Euclid Ave., Cleveland. Estimated cost $40,000.

Refinery (Sugar)—Holly Sugar Co., West Channel, Stockton, Calif., will not construct sugar refinery. $150,000. Project abandoned.

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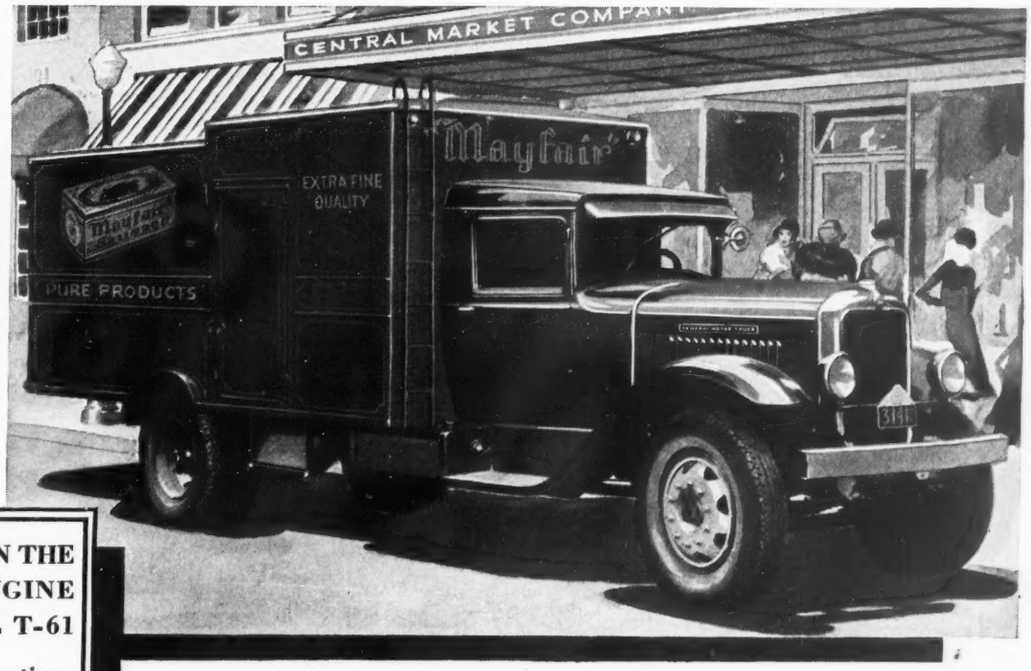
Model T-61 . . . 22,000 lbs. Straight Rating (total gross weight, including load) 4 wheelbases . . . wide range of tire options . . . worm drive standard—double reduction at slight extra cost . . . price 166¾ inch wheelbase chassis only f.o.b., Pontiac, Mich.



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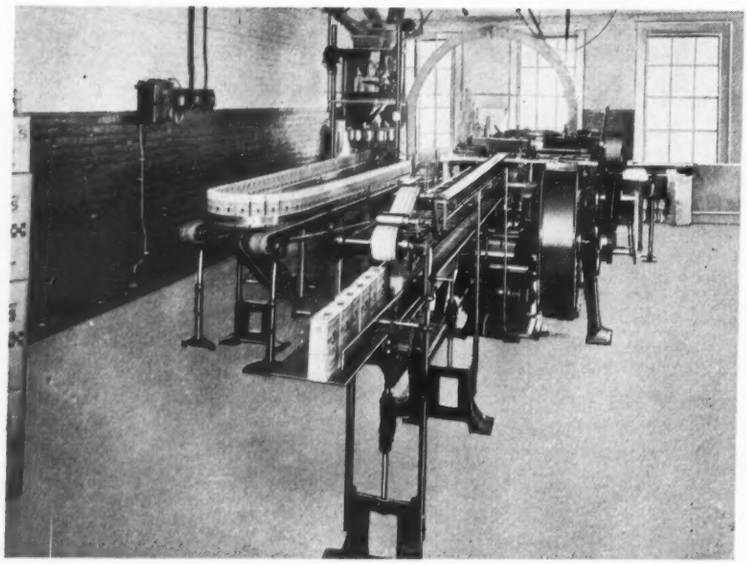

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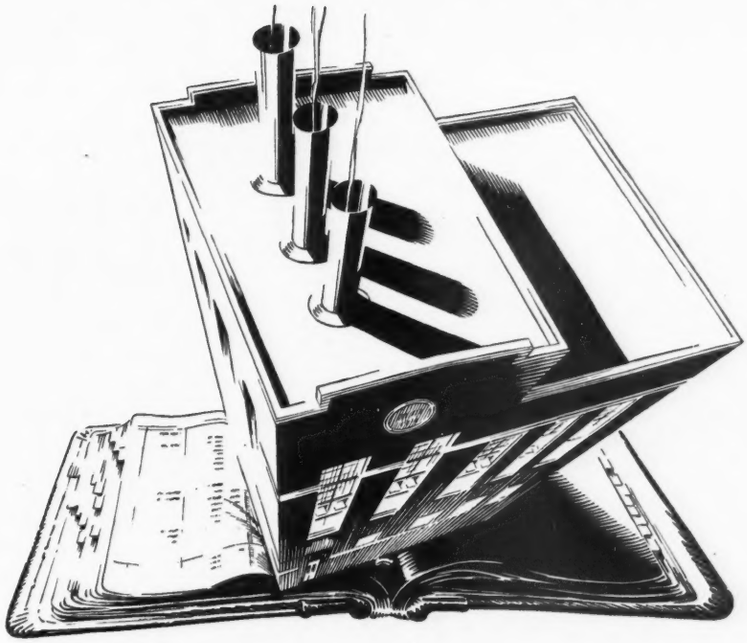

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about losses that "blush unseen" in the balance sheet

? How about *your* steam plant? Always have plenty of power? Probably you've never had to shut down because the steam plant failed. And that may be the reason why you have never had your power facilities thoroughly "dollar" diagnosed.

¢ The cost of steam or power used in the manufacture of your product may be a fraction of a cent . . . insignificant. Often in reducing the cost of a single product it doesn't count, yet at the end of a year's operation, power losses that "blush unseen" in the balance sheet aggregate thousands of dollars . . . in the red instead of in the profit column.

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$ In such cases the value of the outside viewpoint cannot be over-estimated. Why not investigate the "dollars and cents" value of a Steam Plant Survey and Report by Austin Engineers? Their analytical engineering experience has proven very helpful in exposing hidden losses. This service will show you the degree of efficiency of your present facilities. It will tell you what savings can be effected and how. It also will answer the question . . . to buy or not to buy your power.

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Barreled Sunlight is smooth, dirt-resisting, washable as tile. Month after month, it keeps clean, white and bright. So smooth, so non-porous is it that no recesses catch and hold dirt.

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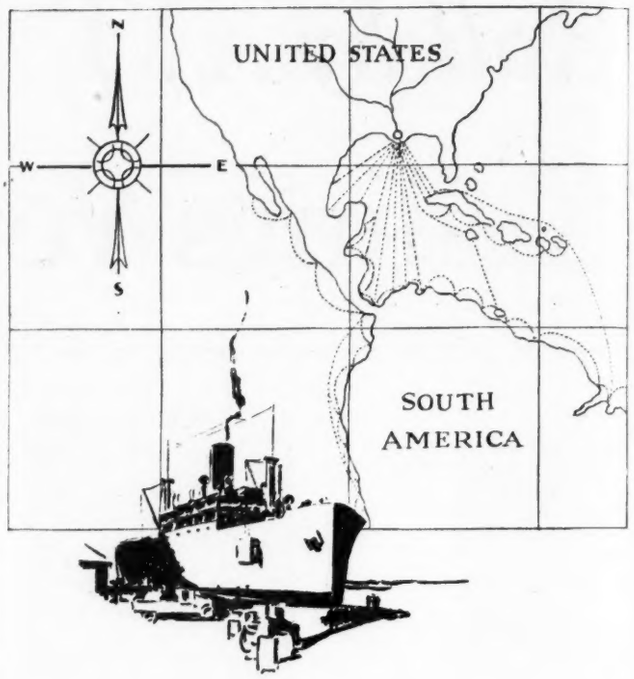

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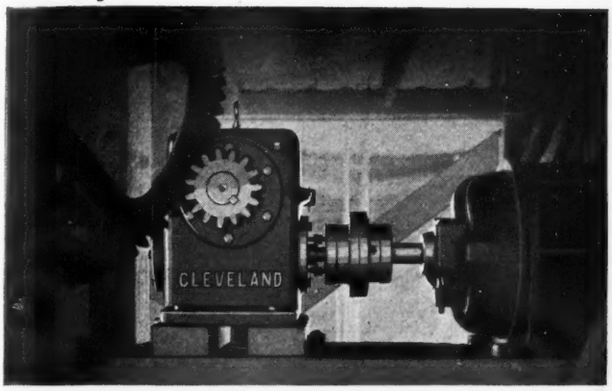

Cleveland Unit Type A H driving green corn conveyer in canning plant. Ratio 17½ : 1, 7 h. p., 1750 r. p. m.

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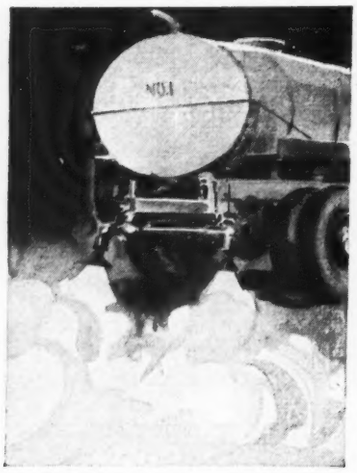

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Fine for settling dust on roads –but mighty risky in flour

DIAMOND CRYSTAL SALT is unique in its freedom from the impurity, calcium chloride which is ordinarily present in salt. One grain of calcium chloride will absorb twenty grains of water. Because of its extraordinary ability to attract moisture, calcium chloride is often sprinkled on roads in order to collect moisture from the atmosphere and settle the dust.

In flour, calcium chloride acts the same way. It creates shotballs. Just a few tiny specks of calcium chloride, particles no bigger than pin points, in the flour package that leaves your mill for the grocery store — and the first damp weather is likely to find that same package marred with shotballs. For a spoonful of this salt impurity is capable of absorbing, remember, all the moisture from 80 cubic feet of air.

Unfortunately, women don't realize that shotballs are basically flour. At some time or another, when using other types of flour, they've probably encountered similar looking little balls — and discovered them to contain worms. So to women, shotballs invariably mean worms — and a warning signal to shift to some other brand of flour.

Diamond Crystal Salt is not only matchlessly free from the impurities which create the risk of shotballs, but also from those common salt impurities likely to give flour a bitter taste. Because of its unique purity, it is white as snow, and identical in shade with well bleached flour. It flows readily and scoops easily from barrel or sack. Since it is free from heavy impurities and since it is flaked, its particles float evenly throughout the flour, and do not sink to the bottom of the package during the bumpy journey from mill to pantry. Still more important is its mild and appetizing flavor which brings out all the delectable flavor of the wheat, and gives the flour itself finer flavor.

Why risk shotballs? Why gamble with good will? Why take needless chances of bitter flavor? Take advantage of the benefits of pure salt, Diamond Crystal Salt, and thereby insure the quality you have been so careful to build up. Diamond Crystal Salt is made by the exclusive Alberger process. Diamond Crystal Salt Company, (Inc.). *Bulk Department*, 250 Park Avenue, New York, N. Y.

Year in, year out, Diamond Crystal Salt averages 99.9% pure—or better

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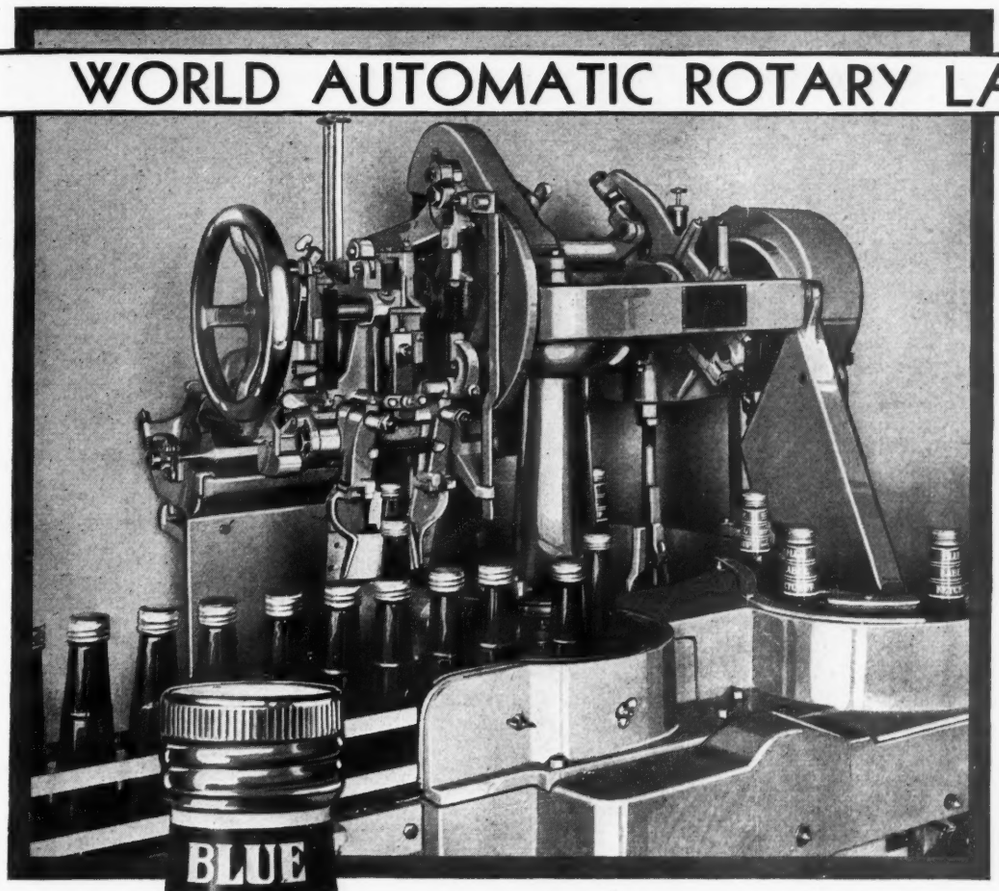

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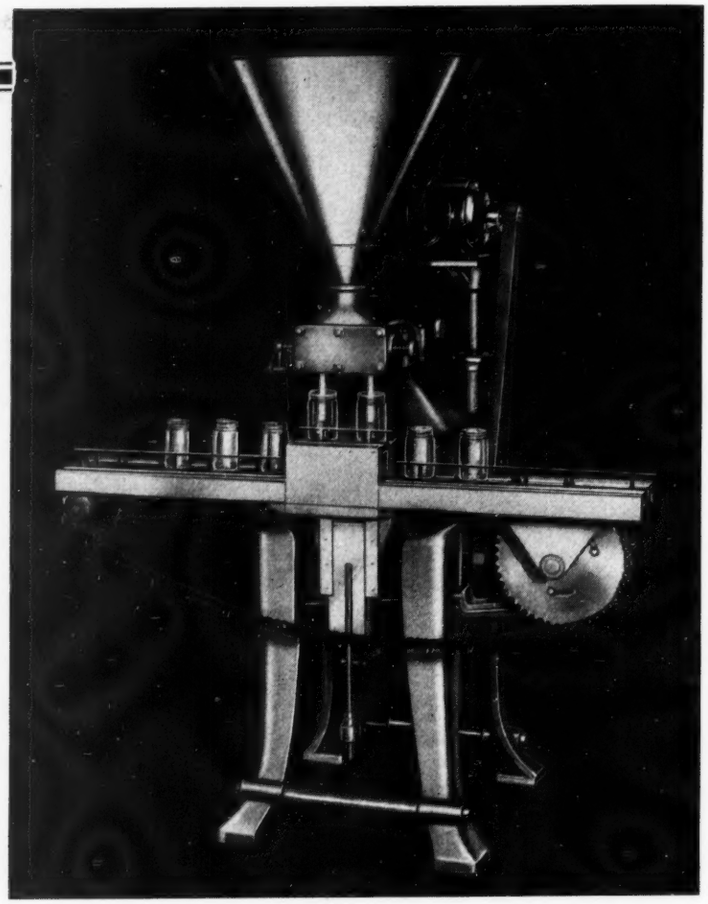

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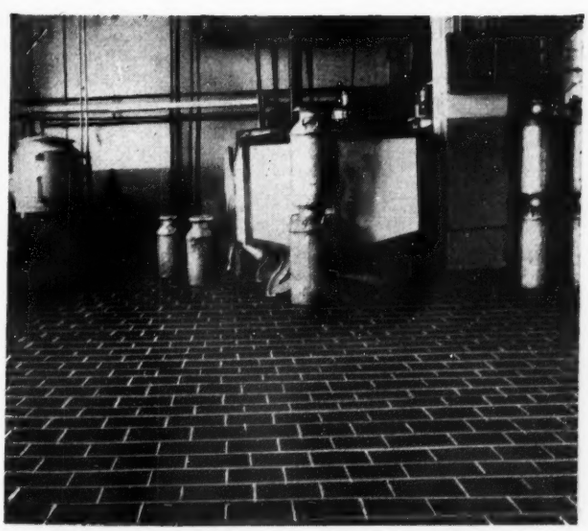
DREHMANN PAVING & CONSTRUCTION COMPANY
508 Glenwood Ave., Philadelphia, Pa.



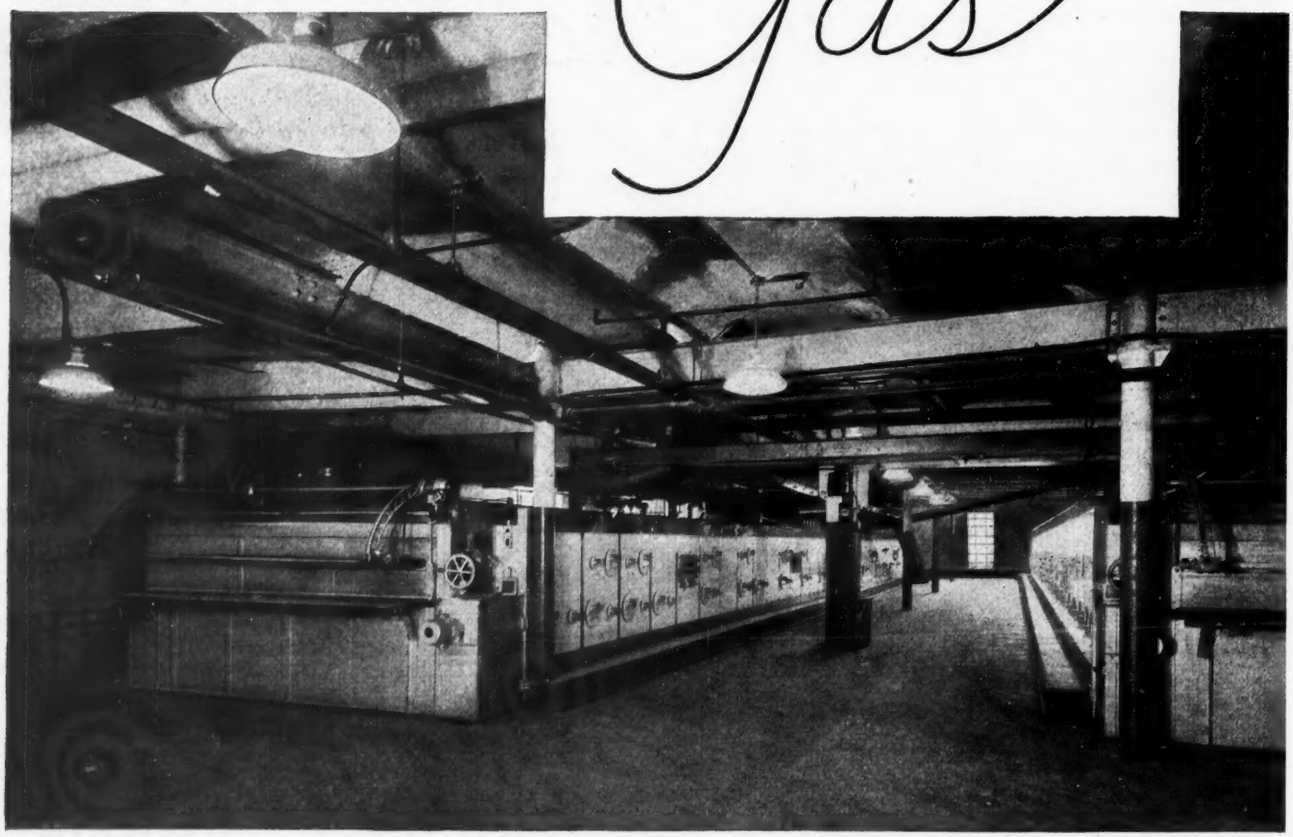
DURATYLE

Permanent

Industrial

FLOORS

The BIG *ones bake with Gas*



■ The more important the bakery, the surer you may be that its ovens are gas-fired. Gas heat has *proved* itself in the baking business . . . the big ones as well as the progressive smaller ones bake with gas. Send for your copy of the new book "Gas Heat in Industry".

AMERICAN *Gas* ASSOCIATION

420 Lexington Avenue, New York

GAS FOR HEAT WHEREVER HEAT IS NEEDED

INSTANTANEOUS CHILLING

... A brief outline of advantages which acrue to users of Vilter planned "Sharp Freeze" Systems

In Ice-making and Refrigerating, one name looms great ... Vilter, the pioneer.

The younger generation, overlooking achievements of the past, is prone to discuss the sharp freeze (or "instantaneous chilling") as a very new development. Yet Vilter has an experience in this "new" field which covers a period exceeding fifteen years.

Just what this experience means to any industry contemplating the installation of an instantaneous chilling system is summarized in the data and findings gathered during fifteen years of first-hand study of actual, operating, proved installations.

To all it must be apparent that such a background can have but one result: *The appointment of Vilter to engineer, design, fabricate and erect an instantaneous chilling plant of any size is a virtual guarantee that it will function perfectly, in accord with predetermined figures.*

* * * * *

Vilter Instantaneous Chilling Systems are preferred by users in all sections of America and abroad because of these outstanding advantages:

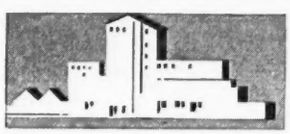
1 ... Defrosting without hot gas connections—a revolutionary method which saves raising room and coils temperatures approx. 90 deg., eliminates extra connections, valves, fittings, etc., banishes wet floors, etc.

2 ... Ordinary ammonia receiver capacity makes unnecessary the installation of oversize equipment, thus effecting a considerable saving on cost.

3 ... Eliminates extra (additional) horsepower required by ammonia circulating pumps—has no accumulators, no liquid pumps; another saving.

4 ... Operates with a suction gas of MINUS 60 deg. F. (low side). Coil system free from oil collection; no liquid slugs back to compressor.

5 ... As an instance of the efficiency of the Vilter Instantaneous Chilling System: In a typical installation, there is an average DAILY quick freeze of 125,000 lbs. of pork (whole hams and bellies) from PLUS 40 deg. F. to MINUS 40 deg. F., *in twelve hours!*



* * * * *

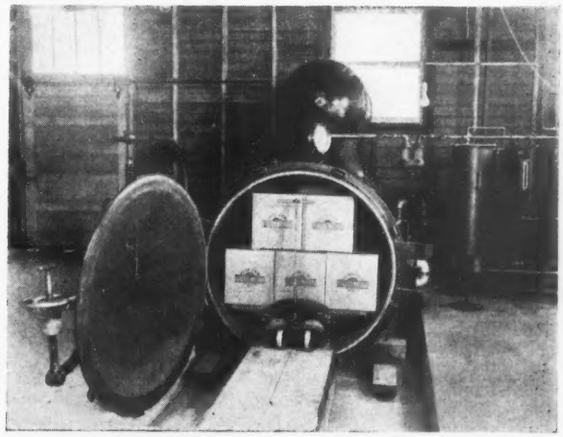
The Engineering Department of this organization will be glad to cooperate with you or your engineers to evolve a quick freeze (instaneous chilling) system adapted to your individual plant requirements.

Write for details without obligation. Or send your blueprints for checking and quotations.

Bulletins, data and special reports on any phase of refrigeration may be had gratis . . . for the asking.

104-30

THE VILTER MANUFACTURING CO.
2115 So. First St. :: MILWAUKEE, WIS.



★ ★ ★ WHY NOT SEE WHAT THE Vacufume WILL DO FOR YOUR PRODUCT?

The Vacufume process destroys all types of insect life in products and commodities of all kinds.

For example, almonds grown in California are treated in a Vacufume and all insect life destroyed before the almonds are shipped.

Figs grown in Turkey are treated in a Vacufume, and the minute insect eggs, invisible to the eye, are destroyed by this unique process.

Cereals manufactured by leading milling companies are put through a Vacufume, and the insect life, which in time will develop into weevils, is destroyed,

If you manufacture any product that is subject to insect infestation, send us a sample, and we will treat it for you in a Vacufume.

Then, . . . you observe the difference between this treated product . . . and the same product. . . . not treated.

Vacufume is a steel chamber. A vacuum is created inside. . . gases are allowed to circulate. Insect life not killed by the vacuum is destroyed by the gases.

Vacufume design and process is patented. It does not change the flavor, texture or color of any commodity.

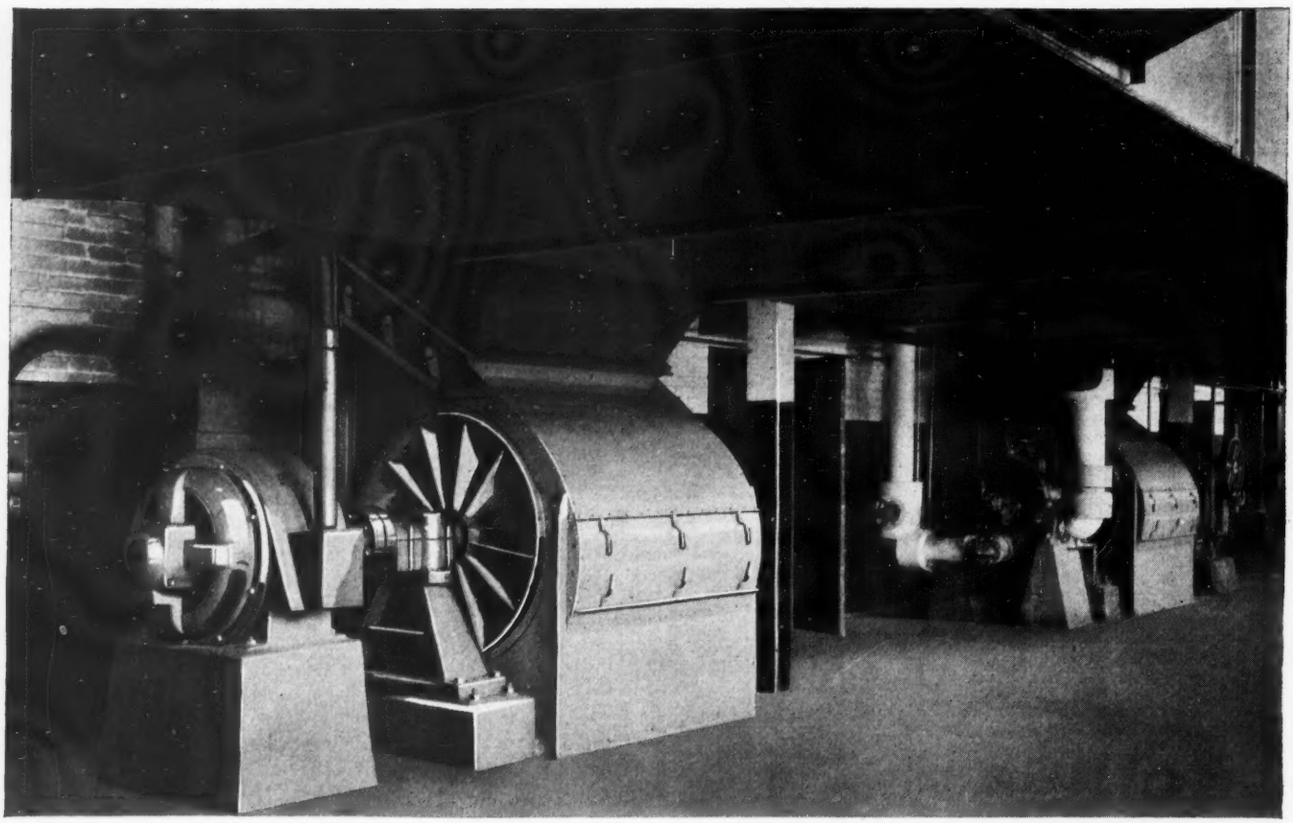
An illustrated booklet describing Vacufume Units, and telling exactly what they do and how they work, will be mailed to you upon request.

UNION TANK & PIPE CO., Ltd.

Mechanical Engineers, Manufacturers of Steel Plate and Sheet Metal Products.

2801 SANTA FE AVENUE
Los Angeles, California

Geared *for* Economy



Buffalo Forced Draft Fans in Power Plant of one of America's Largest Truck Manufacturers

When the automobile manufacturers buy new equipment, they are guided by operating economy more than by just cost.

Steady, 24-hour operation for months and years is the test of forced and induced draft fans—and under such conditions Buffalo equipment operates at the same high efficiency over a wide range of conditions.

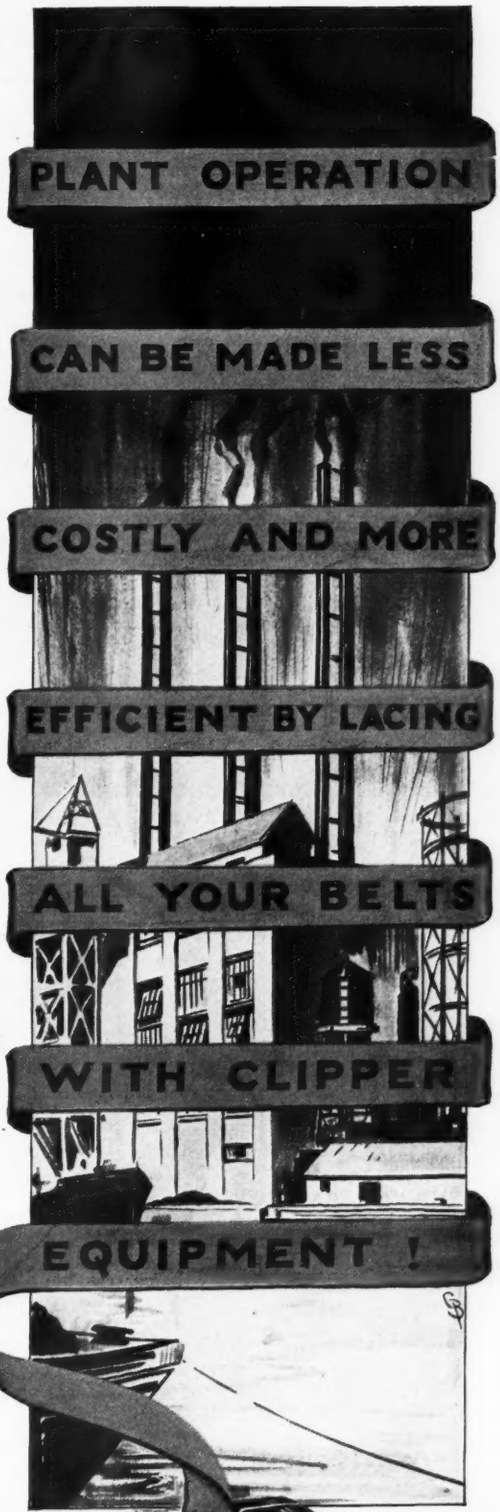
When you buy heating, ventilating or mechanical draft apparatus, be guided by the selection of the largest industrials and public utilities. Specify *"Buffalo."*

Buffalo Forge Company

181 Mortimer St., Buffalo, New York

In Canada: Canadian Blower & Forge Co., Ltd.
Kitchener, Ont.

"Buffalo" Mechanical Draft Fans



QUALITY BELT LACING

Leading industrial plants throughout the world depend on Clipper lacing equipment to help maintain a maximum of continuous production.

Clipper Hooks are actually 20 to 30% lower in price than other makes, yet are unsurpassed in quality and durability.

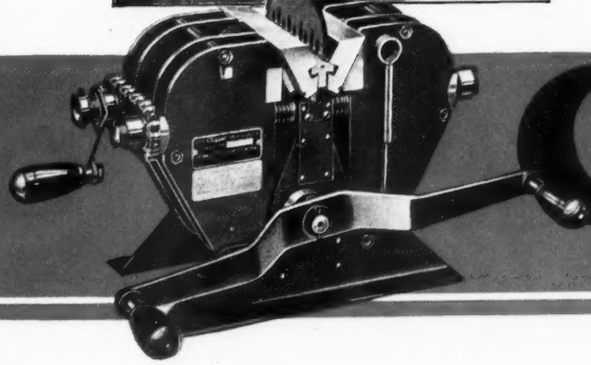
The Clipper No. 6 Speed Lacer, weighing only 56½ lbs., with a pressure of 37,500 lbs., is the last word in belt lacing speed and efficiency.

In exactly 90 seconds this remarkable machine will lace both ends of any belt up to six inches in width with uniform smoothness and precision.

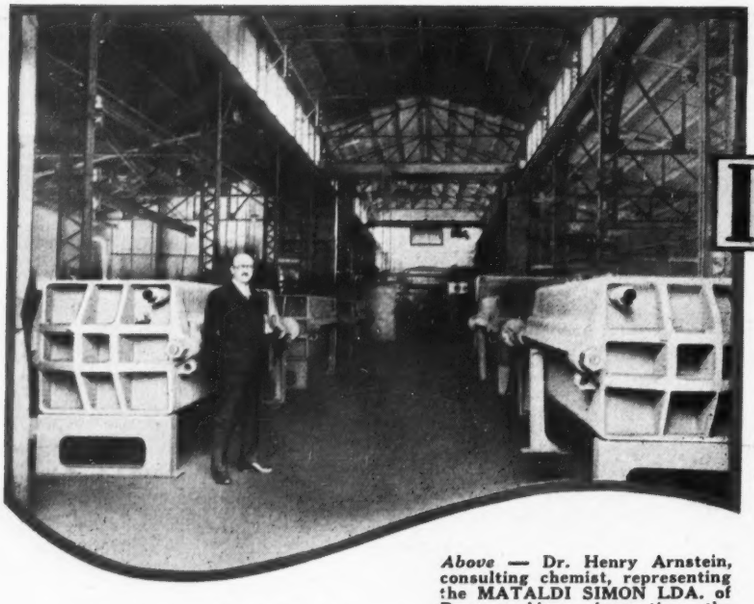
Clipper Lacers are made in types to meet every shop requirement. With Clipper Hooks and Pins they ensure perfect, lasting joints.

For complete demonstration, communicate with your nearest dealer or with the

Clipper Belt Lacer Company
GRAND RAPIDS MICHIGAN



Clipper



Above — Dr. Henry Arnstein, consulting chemist, representing the MATALDI SIMON LDA. of Buenos Aires, inspecting the presses before shipment.

PLATE TYPE PRESSES
use unskilled labor

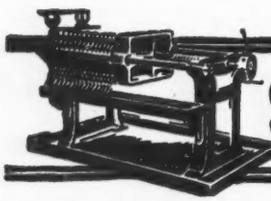
SPERRY PRESSES
for the Argentine

ILLUSTRATING five large Amylo Distillery, waste-reclaiming presses in the erection shop at the Sperry Plant.

These presses are of the open discharge type with two-way cocks and cast iron gutters. Because of their size, the presses are equipped with double-acting hydraulic closing devices for opening the head and closing the plates when cleaning. A considerable saving in time, manual labor and damage to filter cloths is afforded.

Whatever your filtering problem, from the reclamation of waste to the fine filtration requirements in rayon manufacture, a Sperry press, designed for *one particular purpose*, will be far more efficient and far less costly to operate.

D. R. SPERRY & CO., BATAVIA, ILL.



SPERRY FILTER PRESSES

H. E. JACOBY, 95 Liberty Street
New York

B. M. PILHASHY, Merchants Exchange Bldg.
San Francisco

DEATH TO PESTS
SAFETY TO MAN AND PRODUCT

LARVACIDE (Chlorpicrin) REGISTERED

The Ideal Fumigant

YOUR product will not be discolored—its food value will not be impaired—its taste remains unchanged if your plant fumigation is done the LARVACIDE way.

LARVACIDE is safe for your men to use. It announces its presence the same as the now famous "tear gas."

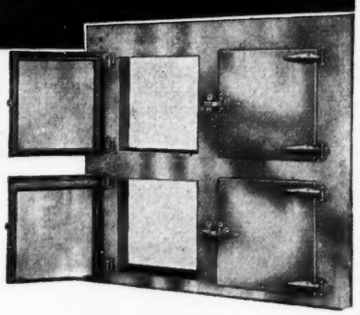
Ask about our "Control Method" of fumigation as rendered by our service organization.

ICCO CHEMICALS

INNIS, SPEIDEN & CO.
117-119 LIBERTY STREET, NEW YORK.

LARVACIDE SERVICE, INC.
NEW YORK KANSAS CITY CHICAGO

REFRIGERATOR FRONTS TO MATCH SURROUNDINGS



Attractive fronts, fully insulated in any desired shape, design, size, and of any facing material and hardware to match surroundings. For cafes, hotels, hospitals, retail stores, etc.

Complete details on request.

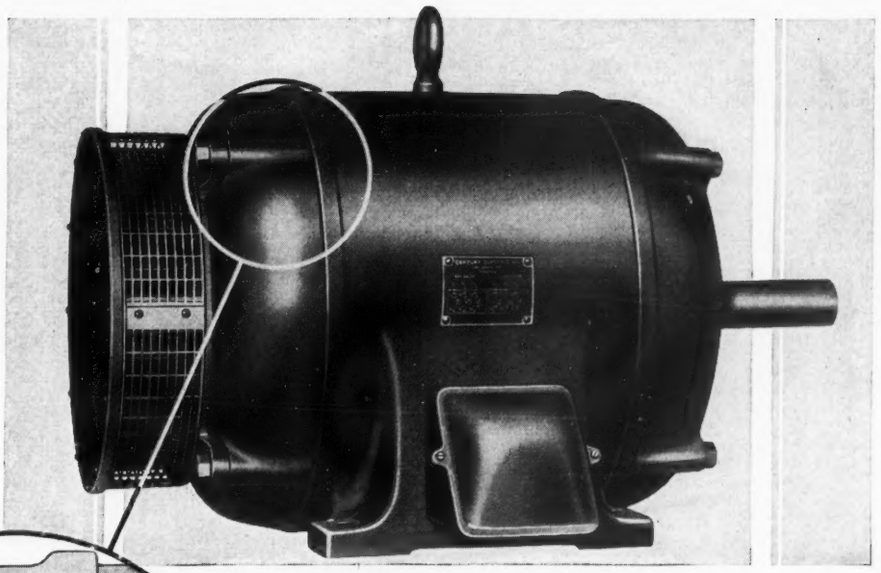
JAMISON COLD STORAGE DOOR CO.
CONSOLIDATING JAMISON COLD STORAGE DOOR CO., INC.
AND STEVENSON COLD STORAGE DOOR CO.
HAGERSTOWN, MARYLAND, U.S.A.

Jamison & Stevenson Cold Storage Doors

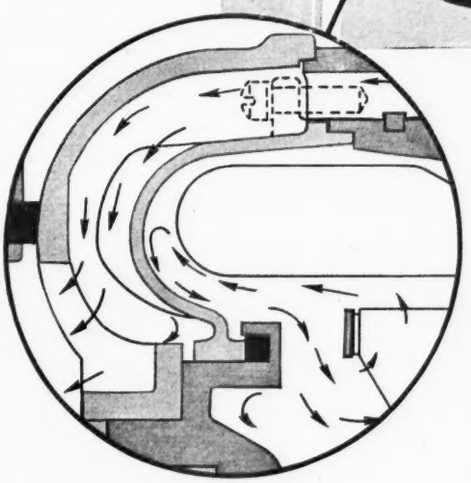
OLDEST and LARGEST makers of Cold Storage DOORS

Branches, Chicago, New York, St. Louis, Chester, Pa. For Southern Representative address Hagerstown, Md. Gay Engineering Co., San Francisco and Los Angeles. D. E. Fryer & Co., Seattle and Spokane
Foreign: London, Honolulu, Japan.

THEY KEEP A-RUNNING



100 Horse Power Century Totally-Enclosed Fan-Cooled Squirrel Cage Induction 3 and 2 Phase Constant Speed Continuous-Duty Motor



Cross sectional view illustrating one feature of Century Totally-Enclosed Fan-Cooled Motor construction. Note especially the rabbet joints between the outer motor casing and the bearing bracket and between the stator shell and the coil guard.

TOTALLY-ENCLOSED FAN-COOLED MOTORS

PROTECTED against dirt, moisture, and all foreign particles. CENTURY Totally-Enclosed Fan-Cooled windings and all vital parts are completely isolated from the outside air by ribbed cast iron enclosures—a very desirable feature for installations in machine shops, foundries, boiler rooms, cereal plants, chemical plants, packing plants, wood shops, textile plants and dyehouses.

Century Squirrel Cage Polyphase Induction Motors are built in standard sizes from ¼ to 250 horse power.

CENTURY ELECTRIC COMPANY

1806 PINE ST. · · ST. LOUIS, MO.

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

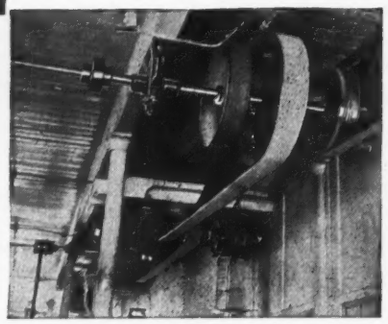
MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

8C-3-100

FOR MORE THAN 27 YEARS AT ST. LOUIS

A 4" double and 2" double respectively. Both of these belts have run for 26 years.

The Greater Economy of DUXBAK BELTING counts MOST where the investment is the largest



8-inch double belts which have been in service for 23 years.

The largest investment in leather belting is in belts of narrow or medium widths. In the narrower widths the greater economy of Duxbak Belting counts MOST. Here you have your largest belting investment. The extra pliability and longer life of Duxbak effect extra economies where the potential saving is greatest.

The photographs here show several installations of Schieren's Duxbak Belting in sizes ranging from 2 to 8 inches in width. Not one of these Schieren narrow or medium width belts has given less than 20 years of service! Try Duxbak Belting on a cost per foot per year basis.

Duxbak Belting is an extra pliable leather belt designed to resist internal friction from bending. Specially tanned, specially finished and specially made to meet present day conditions where long and hard service is demanded.

The longer life and better value of the leather belt are emphasized in Duxbak Belting.

DUXBAK BELTING TRADE MARK

Chas. A. Schieren Company

Tanners
Belt Manufacturers
40 FERRY STREET NEW YORK

CHAS. A. SCHIEREN COMPANY OF CANADA
711 St. James Street, Montreal, P. Q.
64-66 Front Street, W., Toronto, Ont.

CHAS. A. SCHIEREN COMPANY
40 Ferry Street, New York, N. Y.

Please send me copy of folder describing superiority of DUXBAK BELTING.

Name.....

Position.....

Company.....

Address.....

PFIZER'S CITRIC ACID

POWDERED
GRANULATED
CRYSTALS

SODIUM CITRATE

UNIFORM QUALITY
STRICTLY-U.S.P.

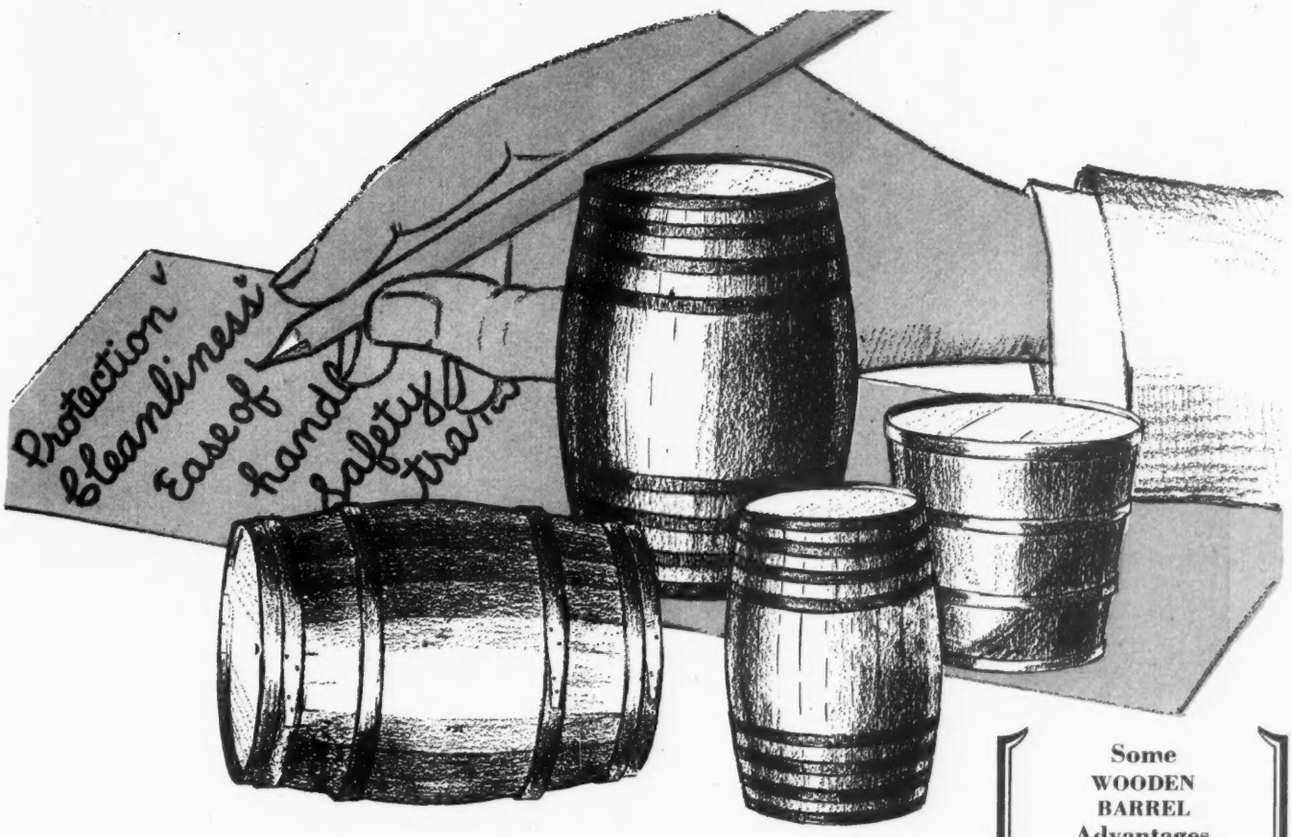
EIGHTY YEARS OF MANUFACTURING EXPERIENCE BEHIND OUR PRODUCTS

CHAS. PFIZER AND CO. INC.

MANUFACTURING CHEMISTS

81 Maiden Lane New York N.Y. — Est. 1849 — 444 W. Grand Ave Chicago Ill.

"OK" —say both Industry and Engineering



Wooden Barrels can take jolts, and bumps as no other container can! Wooden Barrels are made up of many pieces bound together by external pressure. When the jolts come their force is *absorbed* and *distributed* throughout these separate units that make up the complete barrel.

The "double arch" design is a big advantage, too. Wooden Barrels are round and staves are convexed to form the bilge. Thus, barrels take few blows squarely—the contact is always a glancing one.

These are a few features of an engineering design never equaled in container construction. Wooden Barrels protect your products through rough treatment. They are the popular container for products to be handled, stored, and shipped.

The superior design also makes handling easy. Rolling, guiding, and upending wooden barrels is easy.

Assure sanitation, protection, easy handling, and economy by using WOODEN BARRELS. Consult the Associated Cooperage Industries regarding your container problem. They will be glad to give data.

Some WOODEN BARREL Advantages

Protection
- Against contamination
- Against deterioration
- Against atmospheric changes
- Against dampness

Safe in Transit
- Arch design for strength
- "Resilience" due to multiple-stave pressure-bound construction
- Circular form "sheds" the force of blows in transit

Sanitation
- Made of clean, fresh wood
- Contact with exterior moisture causes staves to seal still more tightly

Ease of Handling
- Easy to roll and to guide
- Easy to upend
- Easy to fill and empty

THE ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA
Railway Exchange Building, St. Louis, Missouri

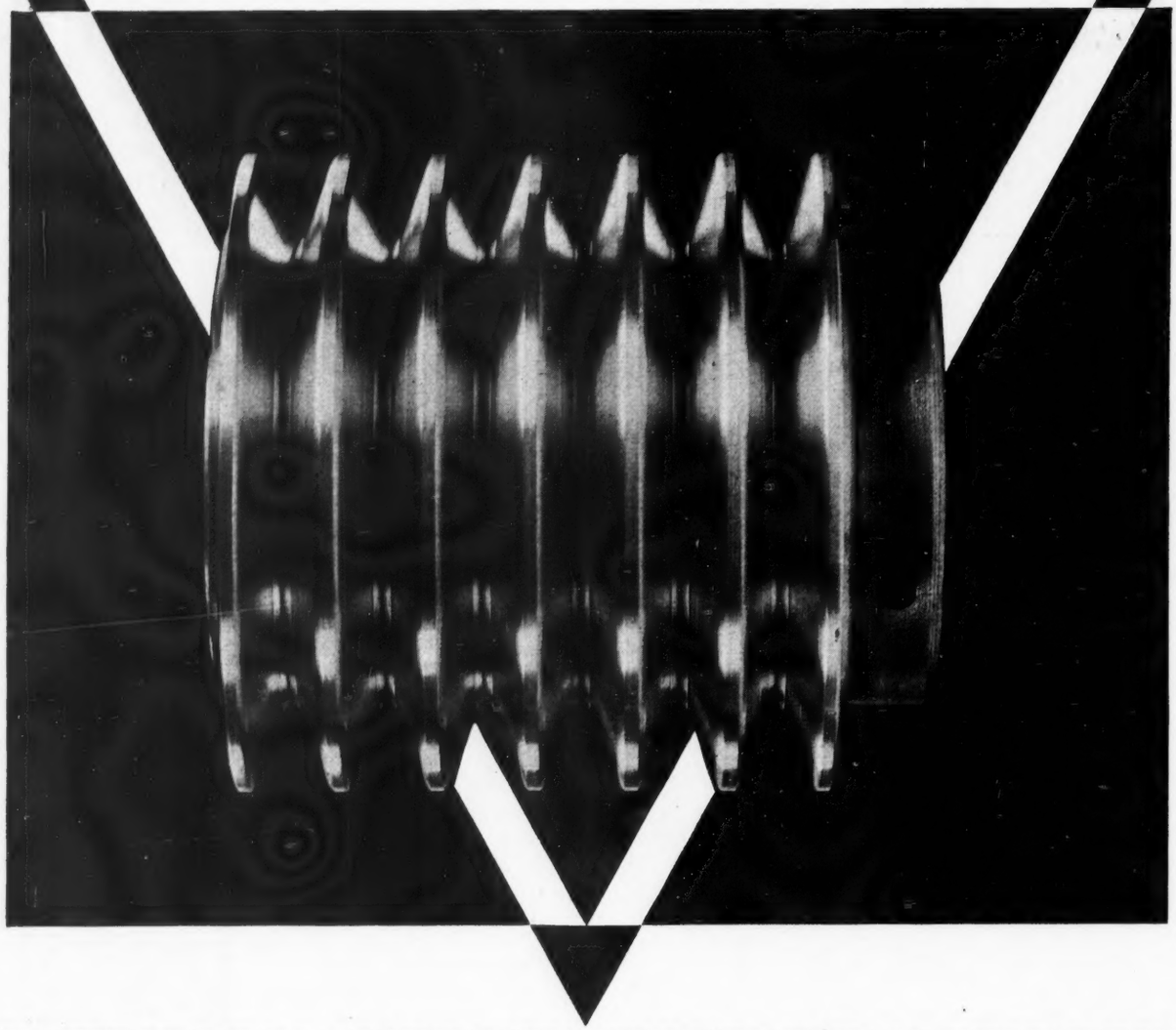
●See the Wooden Barrel Exhibit in Booth 549, Thirteenth Exposition of Chemical Industries, Grand Central Palace, New York City, May 4th, to 9th, 1931.

THE DOUBLE ARCH OF STRENGTH

WOODEN BARRELS

The Double Arch of Strength dissipates shocks and the bilge provides a pivot for easy handling.

WEDGBELT PULLEYS • •



THE FIRST REAL IMPROVEMENT IN THE V-BELT DRIVE

AMERICAN WEDGBELT Drives offer unique advantages of vital importance.

American WEDGBELT Pulleys are responsible. Die pressed from bright steel, they present velvet-smooth, lustrous groove surfaces, unscored or roughened by tool marks.

Belts "flow" over these sheaves with materially less wear since they come in contact with no abrasive surfaces. Likewise, less friction creates less frictional heat to cause premature deterioration of the belts.

Beautifully accurate in construction, WEDGBELT Pulleys assure correct angular relation to the belt and uniform stress, regardless of the number of grooves. Natural balance, of great importance in high speed drives, is inherent in all WEDGBELT Pulleys—a quality that cannot be duplicated economically in other types of construction.

Light in weight, these drives may be shipped and distributed through the nation-wide organization of the American Pulley Company at prices no higher than other leading V-Drives.

Write for further information.

AMERICAN WEDGBELT DRIVES

AMERICAN PULLEY COMPANY
4200 Wissahickon Ave., Philadelphia, Pa.

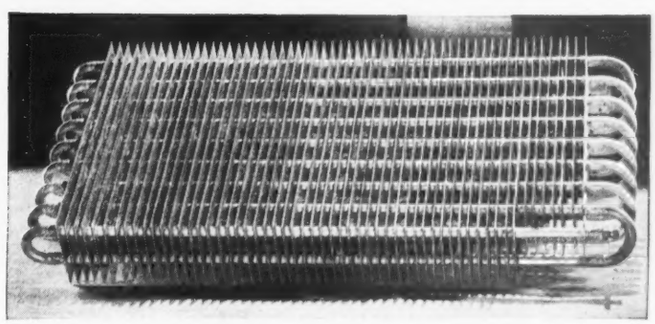
WEDGBELT Drives are any drives in which "American" WEDGBELT Pulleys are used. Look for the lustrous, blue-lacquered steel surface that stands for longer belt life.

Let this refrigeration engineer

show you how this remarkable new coil

RIGHT in your city, there is a man who has a story of vital importance to food manufacturers who are interested in *better refrigeration* for *less money*. This man is the Kelvinator Refrigeration Engineer. And his story is about the new Dry System Cross Fin Coils, the outstanding development in electric refrigeration to-day.

His services are yours, for the asking, without any obligation to you. Upon request he will analyze your refrigeration problems, show you how the new Dry System Cross Fin Coil will cut your costs, and explain to you how this equipment may be purchased on the ReDisCo Monthly Budget Plan. Call him. Take advantage of his expert knowledge and long experience, or, if you prefer, send the coupon and we will forward information about the remarkable new coil.



will save you money on your refrigeration costs

KELVINATOR CORPORATION
14271 Plymouth Road, Detroit, Michigan
Kelvinator of Canada, Limited, London, Ontario
Kelvinator Limited, London, England

(250)

Kelvinator

C O U P O N

KELVINATOR CORPORATION
14271 Plymouth Road, Detroit, Michigan

Gentlemen: Send data regarding the Dry System Coils. Also the name of Kelvinator Refrigeration Engineer in your city. _____ (Check here if wanted)

Name_____

Street Address_____

City_____ State_____

Electric Refrigeration for Homes, Offices, Stores, Factories, Etc.

CHEESE FLAVOR IS GUARDED *by cork in this Armstrong-insulated curing room of the Kraft-Phenix Cheese Company in Larned, Kansas.*

Kraft-Phenix holds constant curing temperatures with CORK

FLAVOR'S the important thing with cheese. And flavor depends largely on the temperature of the curing room. A few degrees too much heat may hasten the curing process and add a bitter taste to the product.

So Kraft-Phenix Cheese Company guards the flavor of American Cheddar Cheese by insulating the curing room in its Larned, Kansas plant. Armstrong's Corkboard was the material chosen—a 2-inch layer on walls and ceiling. This insulated room can be kept at any desired temperature for longer periods, with less variation and at lower expense.

Cork is also used in the cold storage rooms of the Kraft-Phenix plant. Here 4 inches of Armstrong's Corkboard on the walls and 3 on the ceiling help to hold the storage temperature at 33° to 35° F., shutting out heat and preventing spoilage.

Standard Insulation

Armstrong's Corkboard is standard insulation wherever temperature must be controlled. Its heat transmission coefficient is low—it does not deteriorate or decay. Equally important is the fact that cork resists moisture. It will not warp, shrink, buckle, or settle. Properly installed, it will give long and efficient service.

Corkboard has great structural strength. In this plant, for instance, the partitions between cold storage rooms are composed entirely of cork. Resistance to fire cuts down the risk of loss from this danger. And Armstrong's Corkboard comes in a wide variety of thicknesses, making installation easier and quicker.

Armstrong engineers are glad to cooperate in the planning of insulation for any type of work. Their knowledge and experience may be of value to you in your next installation. Write Armstrong Cork & Insulation Co., 948 Concord St. Lancaster, Pa.; and Canadian Offices in Montreal, Toronto, and Winnipeg.

Armstrong's (A) Product

Armstrong's Corkboard Insulation

THE STANDARD INSULATION FOR ALL REFRIGERATION

....There is only ONE TEXROPE DRIVE

It is made by Allis-Chalmers

and its use assures perfect performance!

Internal friction is minimized. The fabric section is used to maintain proper form and position of Texropes in grooves. Outer wrapping keeps moisture or dirt out of cord section and retains belt structure intact.

SO attractive are the savings effected with Texrope Drives that over 100,000 have been sold. Wherever correctly applied they have never failed to give complete satisfaction.

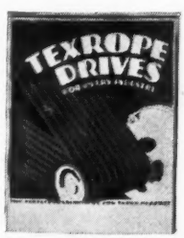
In originating and developing this drive that has revolutionized transmission methods, Allis-Chalmers has achieved the perfection that comes only after years of practical experience.

Texrope Belts possess amazing flexibility and long life. The process by which they are made is the result of every facility of The B. F. Goodrich Rubber Company and the vast Allis-Chalmers organization. The belt cores are built by a special process . . . the outer wrapper prevents dirt from working into the cord section. The belts are formed in accurately machined molds. They always seat perfectly.

In the manufacture of grooved sheaves Allis-Chalmers has secured the perfect balance so necessary to vibrationless operation . . . and the accurate machining that assures perfect seating of belts and unusually long service.

So rapidly have Texrope Drives completely smashed transmission tradition that many imitations are now being offered . . . and the word "Texrope" is often used in referring to *all* V-belt drives.

When you are buying V-belt drives, be *sure* to get the *genuine Allis-Chalmers Texrope Drives* . . . backed by an organization more than 80 years old in the manufacture of power machinery.



The Whole Story in 8 Minutes

In 8 minutes you can get the whole story of Texrope Drives from this illustrated book. *Ask for a copy of Bulletin 1228.*

ALLIS-CHALMERS MANUFACTURING CO.
Texrope Division Milwaukee, Wis.
Specialists in Power Machinery Since 1846

ORIGINATED BY ALLIS-CHALMERS

TEXROPE DRIVES

THE DRIVES THAT REVOLUTIONIZED TRANSMISSION PRACTICE • • •

Let this Coupon

Viking Pump Company
Cedar Falls, Iowa

Please send FREE Viking Catalog and Special Liquid Foods Plant Bulletin.

Name .....

Address .....

City .....

bring you this

VIKING CATALOG

A two-cent stamp invested in the mailing of the coupon above may result in saving you hundreds of dollars in pumping costs. Viking Sanitary Rotary Pumps have lowered pumping costs for hundreds of the country's leading milk, ice cream and liquid foods plants. They can do the same for your plant. We have made it easy for you to get the complete Viking facts. Fill out and mail the coupon NOW.

Viking Pump Company
of Delaware
Cedar Falls, Iowa

VIKING PUMPS

SHRIVER PERFORMANCE

Those who contemplate the purchase of filter presses, be it a single unit or a large scale installation, will find the unparalleled record for performance enjoyed by Shriver Filter Presses of special significance. Performance in the final analysis, is what you really buy in a filter press. Base your choice on performance and you will always specify Shriver Filter Presses. We solicit your inquiries.

T. SHRIVER & COMPANY
Established 1860
860 HAMILTON STREET HARRISON, N. J.
A Filter Press For Every Purpose

SHRIVER FILTER PRESSES

Filter Presses Filter Cloth Diaphragm Pumps

Better than any cleaner he ever used!

AT a California plant making potato chips, cleaning was formerly a difficult, costly task entailing much scrubbing and scraping.

But now cleaning in this plant is an easy, inexpensive operation. The Oakite solution used loosens soaked-in grease from floors in short order. Cotton seed oil is removed from chip pans and drain trays quickly and effortlessly. Little or no brushing is necessary. No wonder the proprietor says that Oakite does a better job than any other material he ever used.

To know what Oakite can do to help you get better cleaning at lower cost, you should see this remarkable material in action. Write and ask to have our nearest Service Man show you. No obligation.

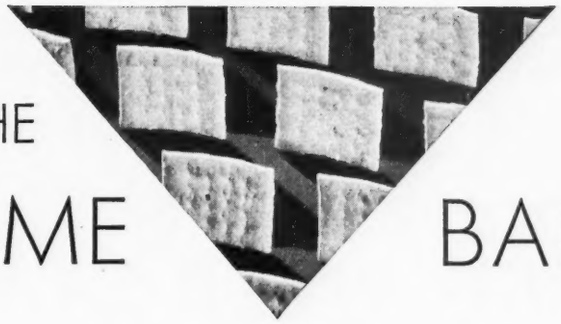
Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the United States and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St., New York, N. Y.

OAKITE

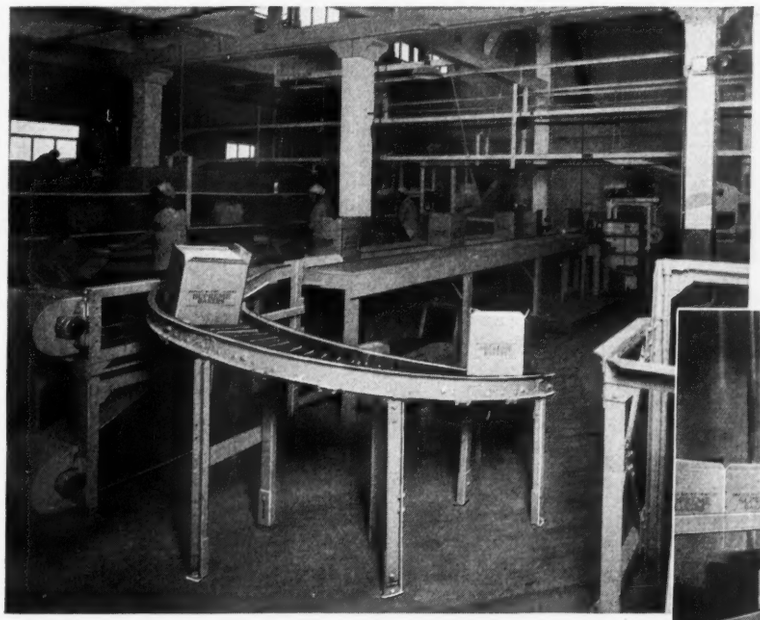
TRADE MARK REG. U.S. PAT. OFF.

Industrial Cleaning Materials and Methods



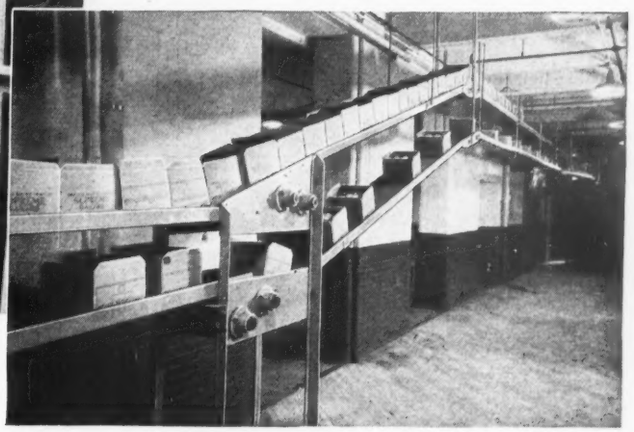
THE SUPREME BAKERS

doubled their per-sq.-ft. production



The confusion of hand trucking is eliminated by these conveyors which distribute empty cartons to the operators and then carry them down four floors to the packing and shipping department.

Aisles are kept clear when conveyors are used. This overhead 2-way belt brings empty cartons to the icing department and takes filled cartons to the packing room.



WITH the installation of a Lamson Conveyor System, the Ontario Biscuit Company, Buffalo, New York, has doubled its output without increasing its floor space. From raw dough to packed carton, Lamson conveyors direct and coordinate the flow of materials, distribute empty cartons to the packers, and quickly gather filled cartons into storage or freight cars. The result is low-cost quantity production.

With your present volume, Lamson conveyors can earn for you a greater net profit through the savings they effect in production costs. Moreover, they will enable you to increase volume without increasing floor space, labor or equipment. Lamson engineers, skilled in the science of industrial conveying, are ready to analyze your production line and to suggest improvements—without cost or obligation. Simply write to-day. The Lamson Company, Inc., Syracuse, N. Y.

LAMSON
CONVEYORS

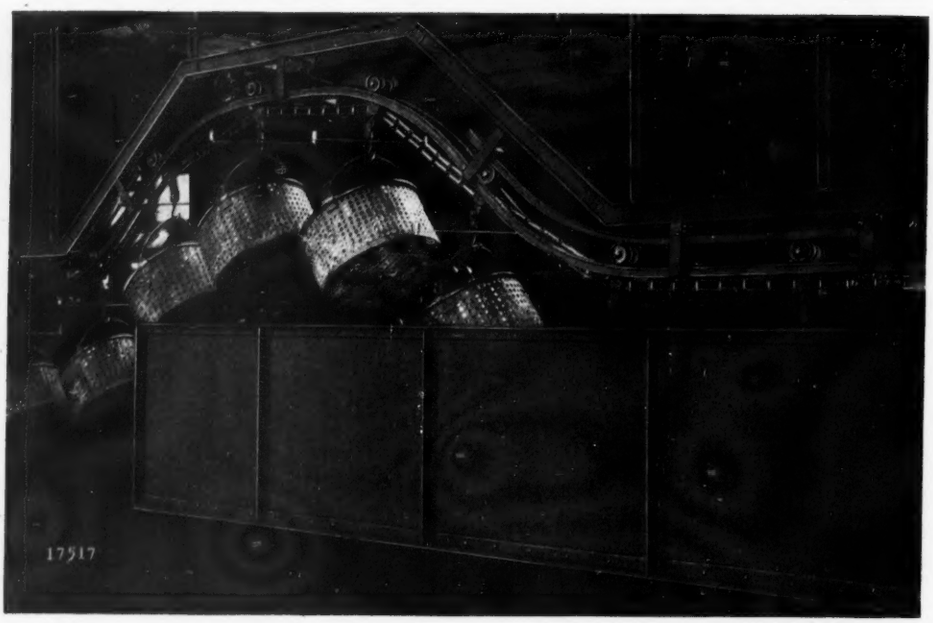
CONVEYORS··PEELING TABLES ··WASHERS··SCALDERS AND TRANSMISSION MACHINERY FOR EVERY NEED OF THE CANNER▲▲▲

Patented and Pat. Pend.

Jeffrey Trolley Conveyor

Illustration on the right shows a Jeffrey Trolley Conveyor handling baskets of canned goods through cooling tanks.

Note how this Jeffrey Trolley Conveyor chords perfectly around vertical curves. The double toggle trolley, an exclusive Jeffrey feature, keeps the trolley at right angles to the curve, saving a lot of chain trouble.



Plan now for next season's pack.

Whether you need Peeling Tables, Washing and Scalding Equipment, Elevating and Conveying Equipment, Chains and Sprockets or Transmission Machinery, there is a Jeffrey Unit to do the job successfully.

Jeffrey equipment will carefully handle perishable products and will give you greater operating economy and increased production.

The coupon below lists the most important Jeffrey Equipment for the Cannery. Check those that interest you and mail the coupon. We will be glad to send you catalogs and submit recommendations.

The Jeffrey Manufacturing Company
927-99 North Fourth St., Columbus, Ohio

New York	Cleveland	Philadelphia	Charleston, W. Va.	Birmingham
Buffalo	Pittsburgh	St. Louis	Cincinnati	Houston
Rochester, N.Y.	Boston	Detroit	Milwaukee	Denver
Utica	Scranton, Pa.	Chicago	Salt Lake City	

Jeffrey Manufacturing Company, Ltd., of Canada. Head Office and Works, Montreal; Branch Office, Toronto

THE JEFFREY MANUFACTURING COMPANY, 927-99 N. Fourth St., Columbus, Ohio

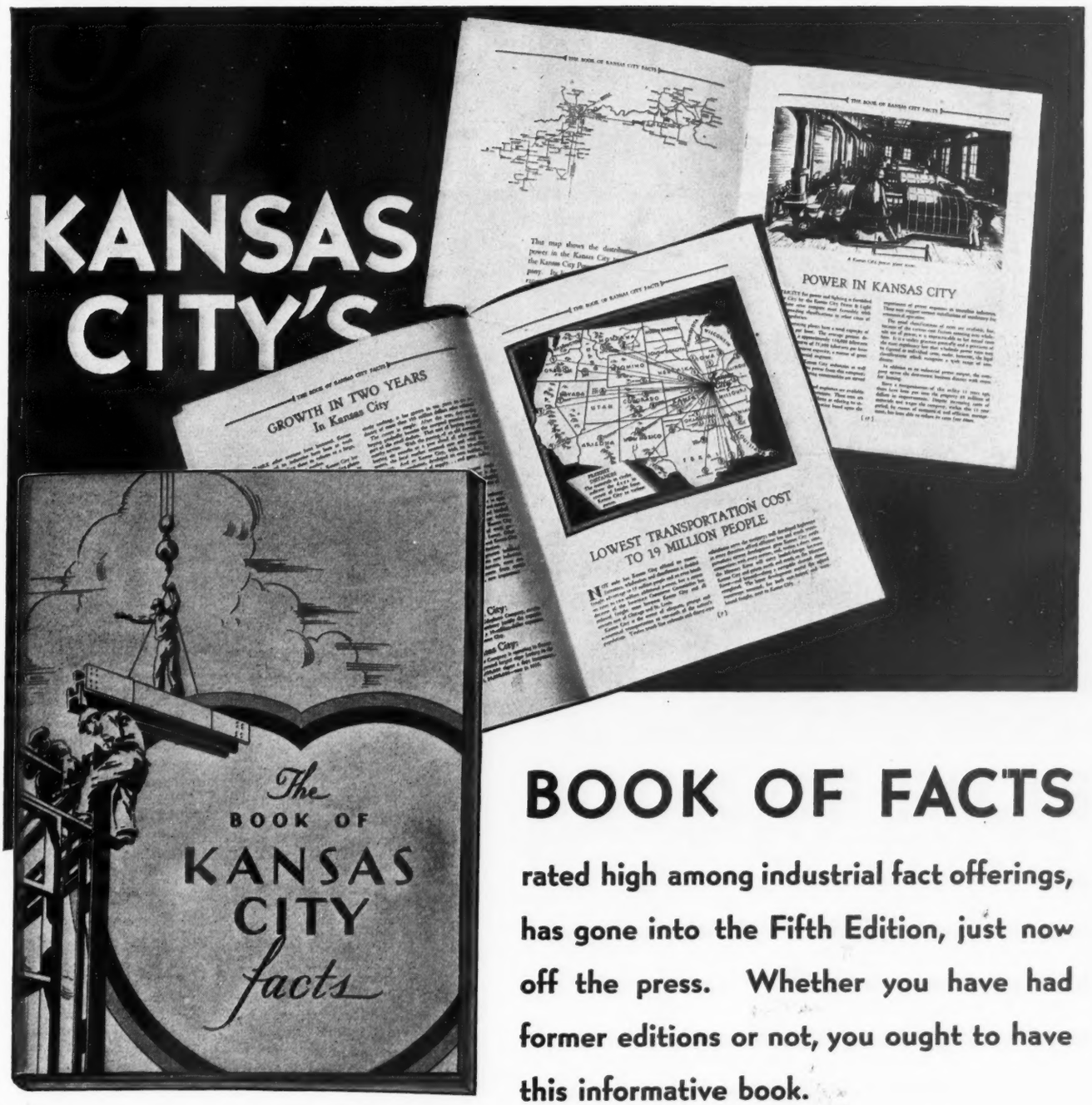
Please send me descriptive Literature covering the Equipment checked below:

- ☐ Picking Tables
- ☐ Washers—Scalders
- ☐ Trolley Conveyors
- ☐ Apron Conveyors
- ☐ Scraper Conveyors
- ☐ Belt Conveyors
- ☐ Chains
- ☐ Transmission Machinery

NAME .....

COMPANY .....

ADDRESS .....



BOOK OF FACTS

rated high among industrial fact offerings, has gone into the Fifth Edition, just now off the press. Whether you have had former editions or not, you ought to have this informative book.

INDUSTRIAL COMMITTEE OF THE CHAMBER OF COMMERCE OF

KANSAS CITY

Nearly ¾ million people live within one hour by motor car from Twelfth Street and Grand Avenue, Kansas City, Mo.

Industrial Committee, Chamber of Commerce, Kansas City, Mo.
Please send me the Book of Kansas City Facts. I am interested in the _____ industry.

Name _____

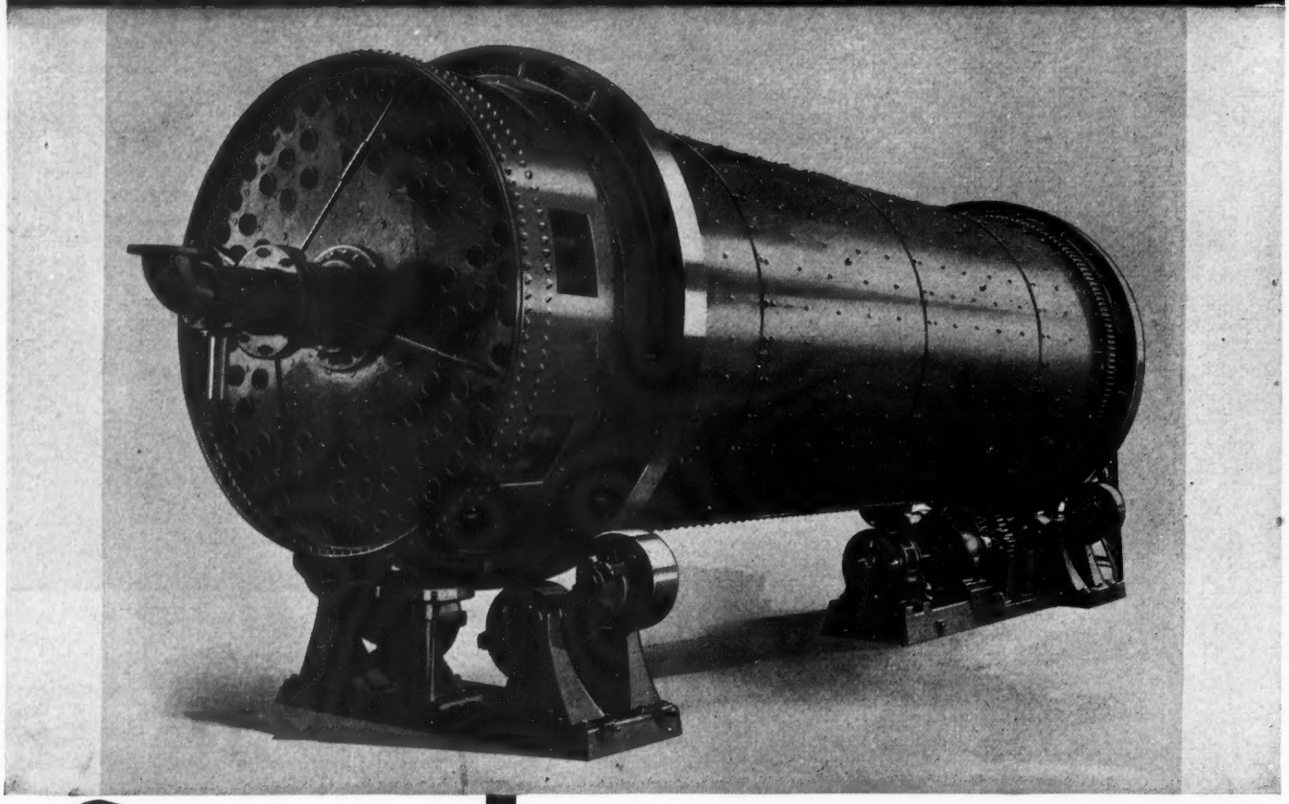
Firm _____

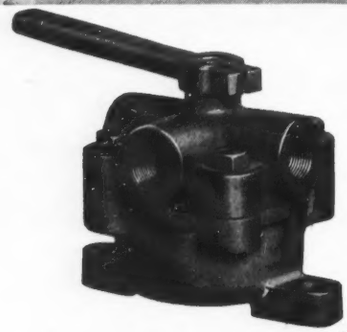
Address _____

City _____ *State* _____

(I saw your advertisement in Food Industries)

DRYERS





NOPAK VALVES

FOR air, water, gas, oil and other fluids, Galland-Henning NOPAK Valves are unexcelled.

Will not stick. No contamination of fluids from valve lubricants. Leakless valve seats protected at all times. Discs definitely sealed whether Valve is closed or in operating position. Permits throttling. Easy to operate. No packing. No tapered plugs.

In standard Straightway, 3-Way and 4-Way styles, NOPAK Valves (no packing) made from ¼" to 2" pipe openings. Write for bulletin.

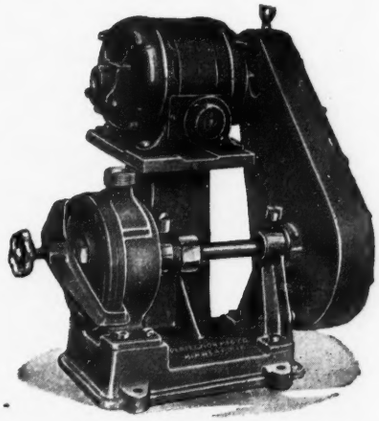
Increase Drying Capacities and Lower Costs . . . with this Modern Equipment

Improved uniform product—increased capacities under all climatic conditions—lowered fuel and power costs — negligible maintenance — these are the guarantee offered by Galland-Henning's 41 years of experience in building and installing all types of Rotary Continuous and Batch Dryers . . . Complete engineering service available to give every job special attention—Let us figure with you on possible equipment, regardless of tonnage requirement.

GALLAND-HENNING
MANUFACTURING COMPANY
2705 South 31st Street Milwaukee, Wisconsin

Outline your dryer needs.
Complete bulletins and blue prints available on request.

A Pump really SANITARY



The Perfection Rotary Sanitary Pump is a clean pump—easy to keep clean. The inside of the pump is highly finished and there are no unmachined pockets or recesses. It is easily accessible and easy to disassemble. It meets all the requirements of any State Board of Health.

The helical gear principle provides a smooth, continuous flow of liquid and eliminates excessive churning. The teeth of the helical gear *shear* through the liquid at an angle instead of splashing through head on.

The Perfection Pump is ideal for handling milk, cream, ice-cream mix, cut corn in canning factories, edible oils, brines, water, molasses, etc.

Write for details.

Perfection Manufacturing Co.
2186 East Hennepin Avenue
Minneapolis, Minnesota

Illustration shows the ease of disassembly, the finished interior of the pump, and the two moving parts.

PERFECTION ROTARY PUMPS

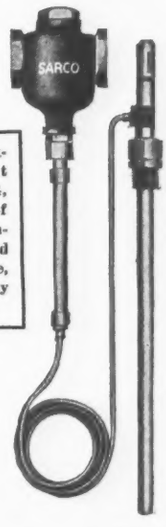
WELL, THAT OUGHT TO GIVE ME ABOUT 190°. GOT TO KEEP 'EM SATISFIED THIS MORNING
PHEW!—20° OFF. BETTER PULL HER DOWN BEFORE THE OLD MAN STARTS RIPPING ME.
THERE WE ARE.—THAT OUGHT TO BRING US DOWN TO 190°—WHERE WE BELONG
HOLY SMOKE, 15° UNDER THE OLD MAN'S ORDER. GOT TO FIX THAT
NOW, DOGGONE YOU. YOU'D BETTER SHOW 190° BEFORE THE SUPER GETS ON MY TRAIL
I GIVE UP, CAN'T SPEND ALL MY TIME ADJUSTING VALVES. I'M GOING TO GET ONE OF THOSE SARCO TEMPERATURE REGULATORS.

Movie of an Engineer trying to do the job of a SARCO Temperature Regulator

Is that a picture of you in your plant trying to do with guesswork what the Sarco Temperature Regulator does automatically and accurately?

Why waste your time and risk ruining goods, when the Sarco will SAVE your time and automatically maintain any desired temperature from 30° to 300°?

The cost of the Sarco is surprisingly low. Installation is simple, as it is entirely self-contained. Operation costs are practically nothing. And maintenance charges are nil, because this simple automatic device has nothing to wear or get out of order.



30 DAYS' FREE TRIAL

Write us today to send you a Sarco for a 30-day FREE TRIAL. If it doesn't prove its value to you send it back and don't pay us a penny. Also ask for Booklet AE-70. Mail the coupon if you prefer.

SEE our Exhibit at Booth No. 34, Exposition of Chemical Industries, Grand Central Palace, New York, May 4th to 9th.

SARCO CO., Inc.
183 Madison Ave., New York, N. Y.

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Without any obligation on my part, please send Booklet No. AE-70.

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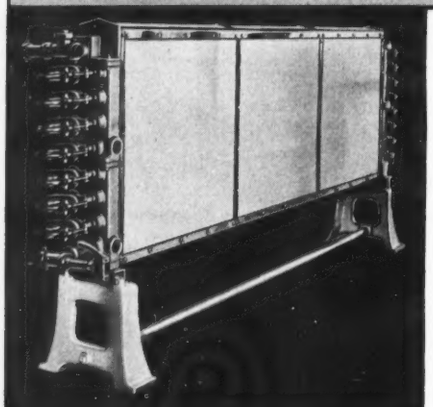
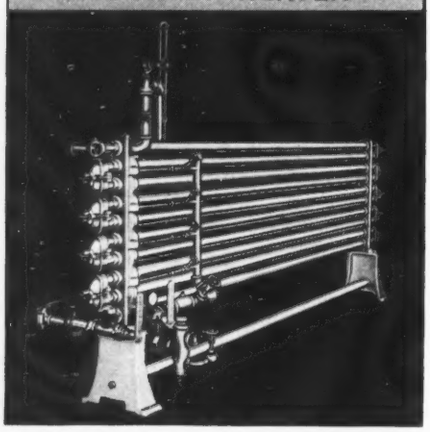
INTERNAL TUBULAR HEATING

HEATING fluids to predetermined temperatures is an important step in the processing of many food products. Efficient in the performance of this important step are BURRELL "STACK TYPE" INTERNAL TUBE HEATERS and BURRELL MULTIJET HEATERS. Stack type heaters come in 8-tube units with individual inlet connections, stack on top of each other on one base, as many as 32 tubes, save floor space, may have enclosing jackets of white porcelain or chrome nickel steel.

WHERE PROCESSING INVOLVES QUICK HEATING OF LIQUIDS . . .



BELOW—A BURRELL MULTIJET HEATER



IN these heaters the liquid is pumped through inner tubes, surrounded by larger outer tubes through which the heating medium circulates, especially favoring large capacity operation at low working pressures. Unit design permits maximum flexibility of capacities to meet changing conditions.

BURRELL MULTIJET HEATERS, of demountable single tube design, heat to high temperatures with extreme ease, rapidity and efficiency. Original temperature of heating medium restored at every other tube by admission of steam through series of jets. High rate of heat transfer and large capacities possible.

Descriptions of these heaters, capacities, applications, mailed immediately upon receipt of your request.

●

CHERRY-BURRELL CORPORATION
427 W. RANDOLPH ST., CHICAGO

Baltimore	Cleveland	Milwaukee	Philadelphia
Boston	Columbus	New York City	St. Paul
Cedar Rapids	Detroit	Peoria	Syracuse
Cincinnati	Little Falls	Pittsburgh	Tama

Cherry-Burrell Corporation of Canada, Ltd., Brockville, Ont.
Export Office: 31 Union Sq., New York City — Cherry-Burrell, Ltd., London, England

Let Us Help Analyze Your Shipping Problems

We do not claim that permanent steel containers are a panacea for all shipping ills. Our thirty years' experience in helping manufacturers work out the most economical methods for shipping liquid and dry bulk materials has taught us differently. But we do know that many of these manufacturers have saved as high as 50% in their shipping costs by changing from light weight shippers to Hackney permanent steel barrels and drums. Let us work with you in determining the most economical method for shipping your products. To the right is one example of what we have been able to help other manufacturers accomplish. There's no obligation.

EXAMPLE

In 1926, '27, and '28, "B" Company spent on an average of $31,000 per year for single trip containers.

In 1929, "B" changed to Hackney permanent steel drums. And after adding such expenses as depreciation, interest, return freight, extra freight on out-shipments, insurance, maintenance and clerical costs—the total came to only $14,384—a saving of $16,616—or 53%.

In 1930, total costs were $11,508. The volume of business was smaller, but the percentage saving was practically the same as in 1929.

A Few Prominent Hackney Users

Wadhams Oil
Eastman Kodak
A. T. & S. F. R. R.
Johns-Manville
Air Reduction Sales
General Electric
Colgate-Palmolive-Peet
Pratt & Lambert

PRESSED STEEL TANK COMPANY

1173 Continental Bank Bldg., Chicago
1349 Vanderbilt Concourse Bldg., New York City
5771 Greenfield Avenue, Milwaukee, Wis.
477 Roosevelt Bldg., Los Angeles

Hackney
MILWAUKEE

A large white dial with heavy black figures and a brilliant red pointer make Motoco Industrial Thermometers easily and accurately read. Available in temperature ranges from −40° to +750° F. or the equivalent in centigrade, each dial can be plainly read at 20 feet.

In addition to these bold dials Motoco Thermometers may be installed upwards of 50 feet from where the temperature actually is taken. All readings represent true temperatures at the point where the bulb is inserted. Think of the convenience and greater ease in reading that is derived from having all your gauges mounted on one central control panel.

Twenty years of fine instrument manufacturing experience, coupled with exhaustive experimental and research work, assures you that in Motoco Industrial Thermometers you will find all the accuracy, durability and efficiency you desire. Check your thermometer equipment today, for in such a check-up you may find inefficiency that is affecting your profits. Our engineers will be glad to consult with you on your temperature problems—write us.

ACCURATE TEMPERATURE READINGS ARE IMPORTANT

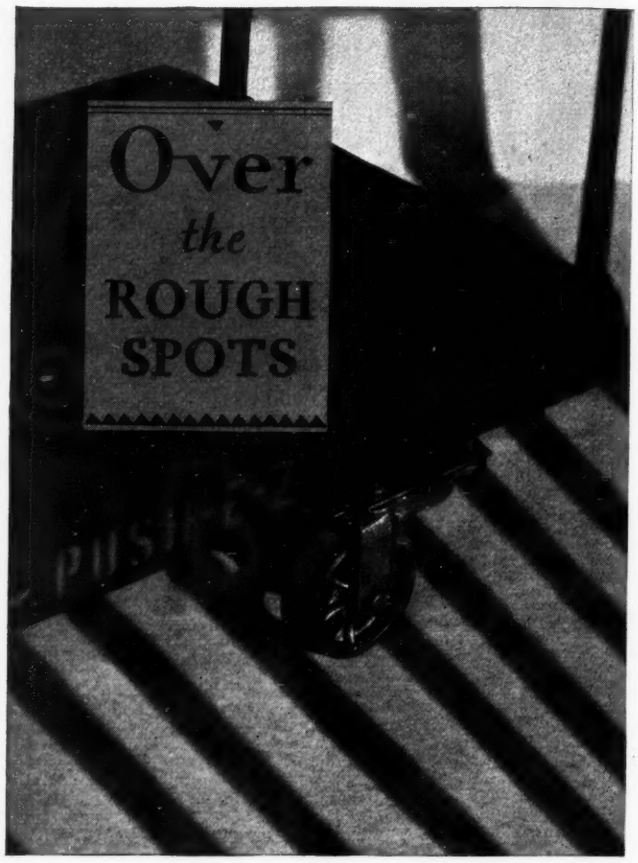
Moto Meter also manufactures a complete line of vacuum and pressure gauges

MOTO METER

GAUGE & EQUIPMENT CORPORATION

TOLEDO, OHIO

FACTORIES AT TOLEDO • LA CROSSE • CANADA
ENGLAND • FRANCE • GERMANY • AUSTRALIA



.... *as if they were* SHADOWS

THEY are shadows to the Service Push E-Z Truck. Rough flooring—sills—broken concrete—These are the ambushed enemies of ordinary trucks, secretly sharpshooting at your hauling costs.

Push E-Z long ago saw conditions as they were—armed itself with bearings which never flinch at a jolt or a jar. Timken thrust bearings, Service ball and Hyatt roller bearings reduce shocks—yes, to shadows—under these spinning wheels and easy steering casters.

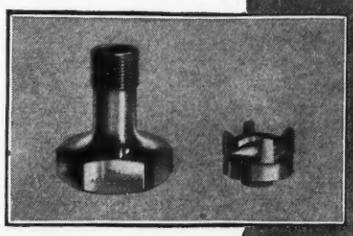
Service running gear begins the story of what Service Push E-Z Trucks can do for you in prolonging equipment life—saving floors from punishment. From the floor up, the same story carries through to other details. *Ask us to tell you all about this super truck.* Write today.

SERVICE CASTER & TRUCK CO.
525 N. Albion St., Albion, Michigan

Chicago: 603 Washington Blvd. New York: 200 Lafayette St. San Francisco: 61 Bluxome St.
England: 15 Mallow St., Old St., London Canada: Brock & Campbell Sts., Brantford, Ont.

Service
CASTERS & TRUCKS

EXTRA WEIGHT
means extra service



THE extra weight of Fig. 106-A Jenkins Standard Bronze Globe Valve is a result of extra metal . . . and every extra ounce means extra service . . . longer, leak-tight valve performance.

In this sturdy Jenkins, as well as in its corresponding angle and cross types, are combined both the one-piece screw-over bonnet and the slip-on stay-on disc holder.

The bonnet construction is a refinement which provides unusual strength. The bonnet can be easily removed and replaced *repeatedly* without springing or distorting. Jenkins slip-on disc holder is unique in that an opening turn or so of the hand wheel is sufficient to prevent it from dropping off the spindle when the valve bonnet is removed.

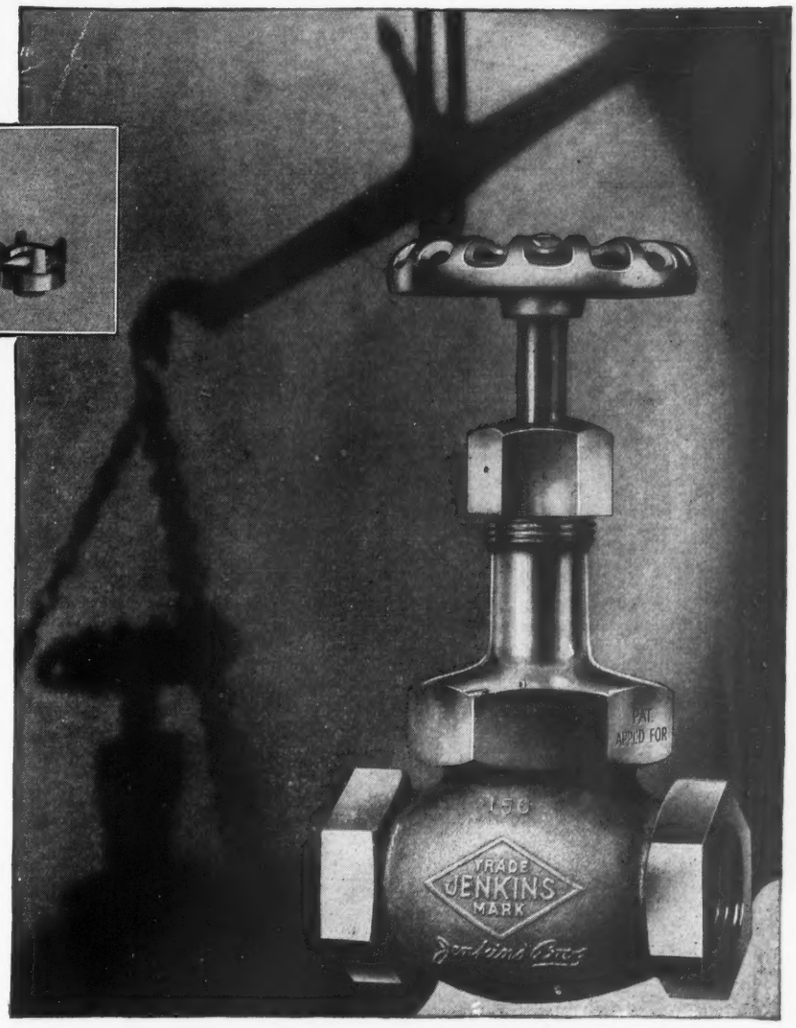


FIG. 106-A, *Screwed, Jenkins Standard Bronze Globe Valve, with one-piece screw-over bonnet and slip-on stay-on disc holder. For 150 lbs. steam working pressure, or 250 lbs. oil, water, gas working pressure.*

Ask your supply man to show you Fig. 106-A. It is an up-to-the-minute valve with all the earmarks of Jenkins quality. Write for illustrated Bulletin 141.

JENKINS BROS.

80 White Street, New York, N. Y. | 524 Atlantic Avenue, Boston, Mass. | 133 No. Seventh Street, Philadelphia, Pa.
646 Washington Blvd., Chicago, Ill. | 1121 No. San Jacinto, Houston, Texas
JENKINS BROS., Limited, Montreal, Canada; London, England
Factories: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Canada

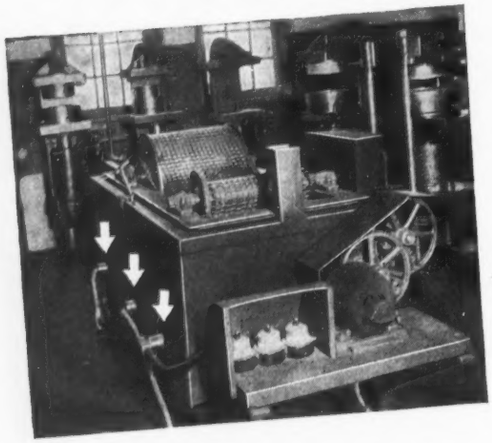
Jenkins
VALVES
Since 1864

JENKINS VALVES ARE ALWAYS MARKED WITH THE "DIAMOND"

Modernize with G-E "Spots of Heat"

FOR HEATING JOBS LIKE THESE

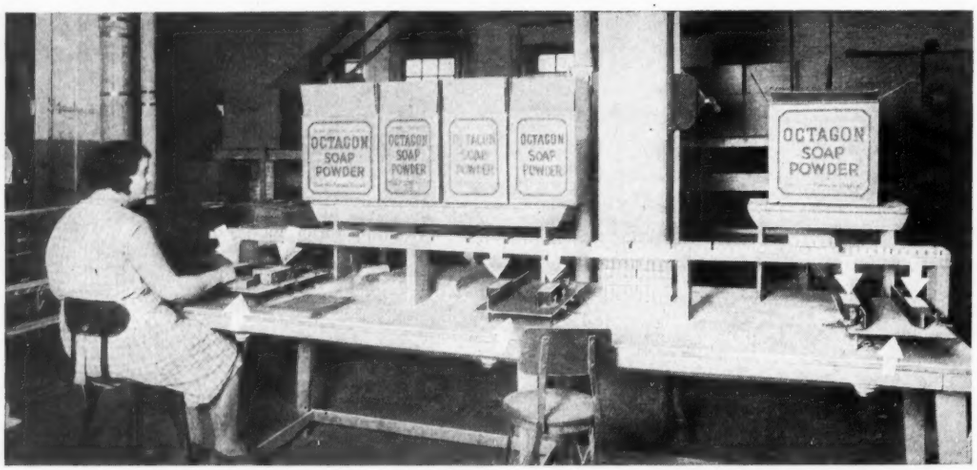
HERE are two examples of the hundreds of ways in which you can use these handy G-E "Spots of Heat" (localized electric heating units).



Three G-E immersion units screwed into an outer tank containing Transil oil furnish heat for the inner tank containing waxes and oils. Used for treating packing-cup discs

They cost very little, are easy to store, can be made to do an amazing number of heating jobs, are easy to apply, and provide clean, safe, concentrated heat just where you want it and as soon as you want it.

They are made in a half-dozen different styles. Ask your nearest G-E office for prices, shipments, and information concerning their application.



Three package sealers each equipped with two G-E 150-watt cartridge units embedded in brass on each side of sealer and one 300-watt unit embedded in bottom. Packages, wrapped in wax paper, are pushed through the tight-fitting heated frames and sealed by the heat

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

570-154

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

FRUIT JUICES Cannot Corrode Safe ENDURO Equipment

ENDURO

That's why THIS perfected stainless steel was chosen for this grape juice vacuum pan

■ WHEREVER FOOD products must come in contact with metal, be sure the metal is ENDURO—the perfected stainless steel. Even fruit juices cannot corrode ENDURO. Thus the product will always be safe, free from any metallic taint or foreign flavor.

■ And ENDURO equipment will serve far longer. It has no plating or surface coating to peel off or wear away. The hard, glass-smooth surface will never discolor—its lustrous finish remaining indefinitely. It cleans as easily as glass, without requiring abrasives or strong cleaning liquids.

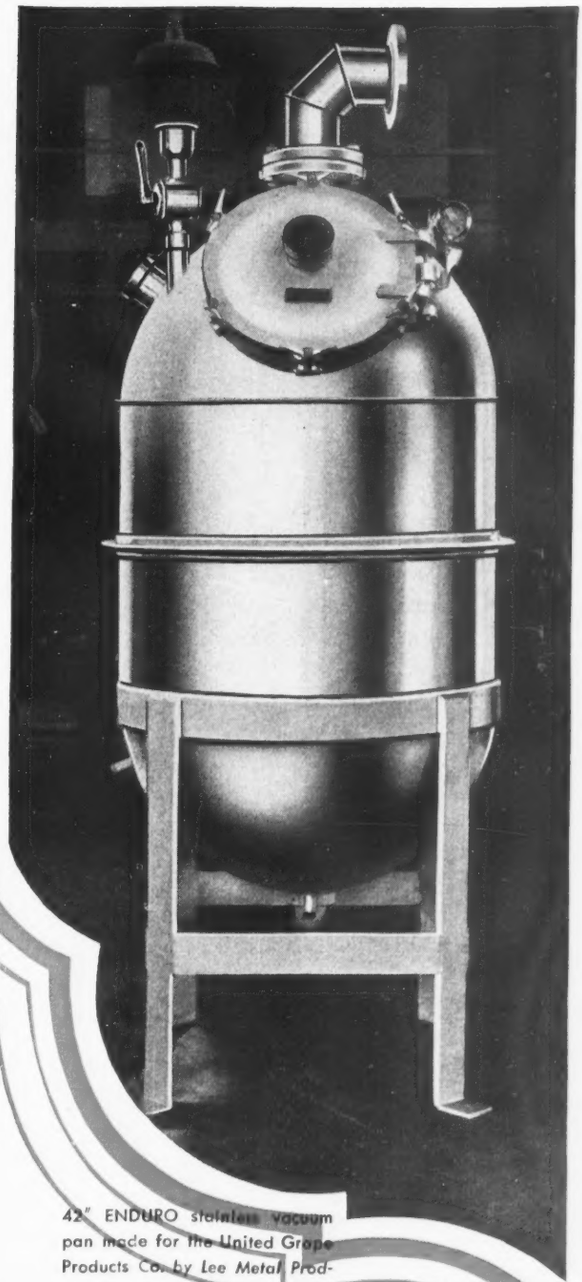
■ For these reasons there are numerous types of ENDURO equipment being installed in food plants every day. Let us put you in touch with some of these plants and learn what they think of ENDURO equipment. You will undoubtedly find that ENDURO is the metal exactly suited to your needs.

Central Alloy Division

REPUBLIC STEEL CORPORATION

Massillon, Ohio

Enduro KA2 is sold only through Republic Sales Offices and authorized Distributors



42" ENDURO stainless vacuum pan made for the United Grape Products Co. by Lee Metal Products Co., Inc., Philipsburg, Penn.

ENDURO

NIROSTA KA2

the perfected stainless steel

GETTING THE "BIG IDEA"

TINY bubbles rising from a tea-kettle—that was all. It had been a common sight to generations of men.

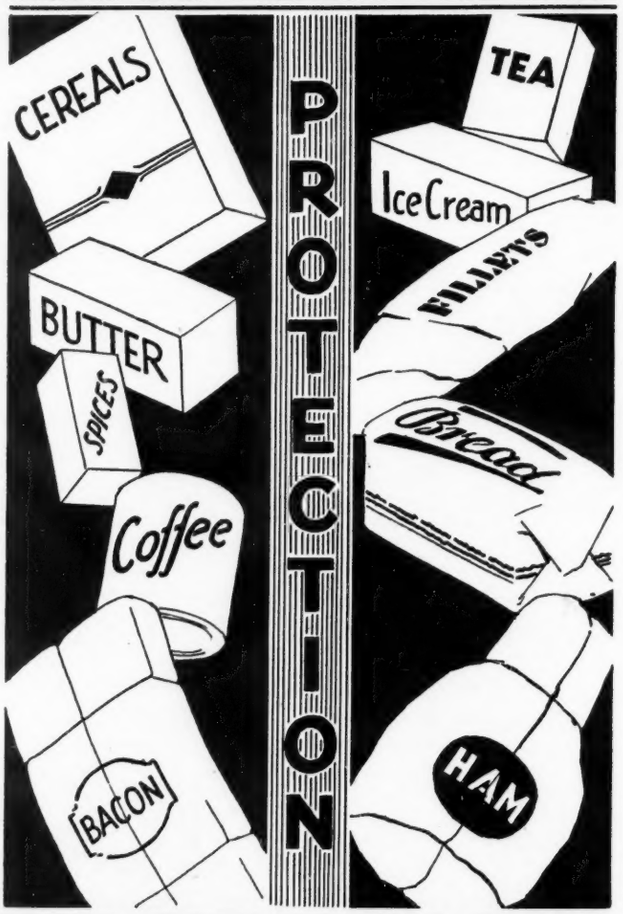
But the vision James Watt saw, in the tiny clouds of steam, the power which should re-make the world — he had the "big idea."

Just so the business of this Company has been built around **Ideas!** Not simply making Paper but developing all its possibilities for the service of the people. On this service has been established the growth and continued success of "The World's Model Paper Mill."

This service is more than a question of the right wrapping; it means full protection for all kinds of food products, under all conditions. Every member of this Company — from the president to the humblest in overalls, is on the alert to find better ways to fulfil present needs and anticipate the new.

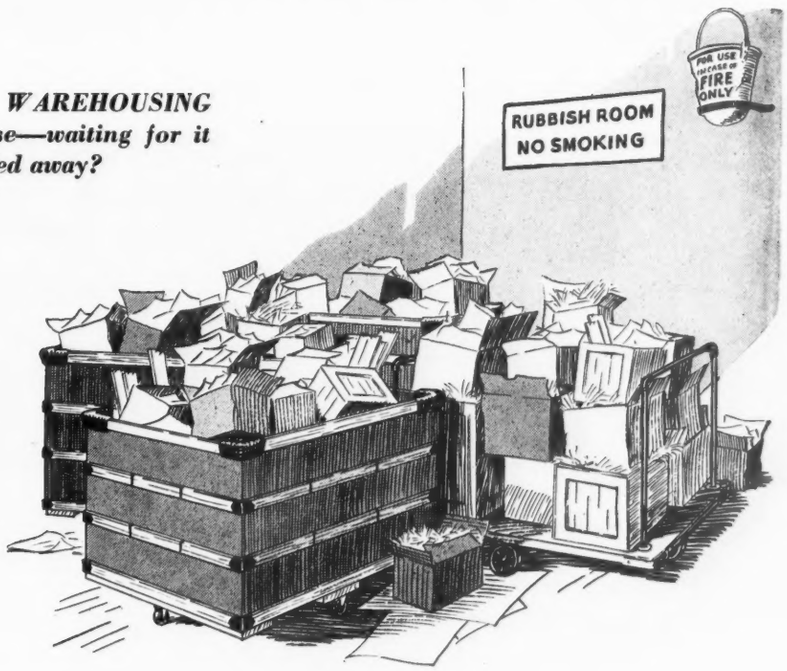
KVP Laboratory research experts are at your command; if need arises for some special, exclusive type of protection, do not hesitate to call on us for advice and suggestion.

KALAMAZOO
VEGETABLE PARCHMENT CO.
KALAMAZOO -- MICHIGAN



KVP PROTECTION PAPERS • • •

Are you WAREHOUSING your refuse—waiting for it to be hauled away?



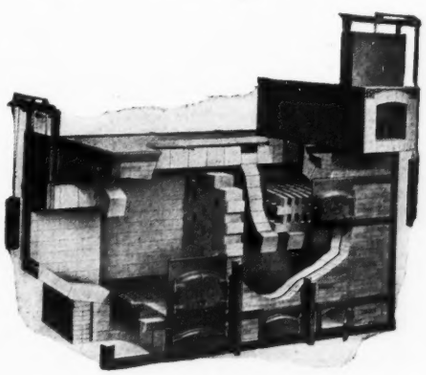
For Safety and Savings—

Burn it up!

STORAGE and handling of combustible rubbish is a continual threat of fire. It is wasteful of time, space and money. *Eliminate* the danger and the waste by destroying your combustible refuse as fast as it accumulates!

Here is equipment built for the purpose, tried and proven by hundreds of installations—and ready for your use. Modern incineration in a Morse Boulger Destructor gets rid of your plant refuse promptly, safely, economically. Dozens of food manufacturing and handling plants have already adopted it for increased safety and greater economy.

Modern incineration means complete burning of any waste matter that is not actually liquid. Equipment designed for the work by experienced men burns such refuse without objectionable smoke or odor. The cost is usually so low as to show a good saving over the expense in space and labor of make-shift disposal methods.



Special process wastes are handled, as well as general rubbish. Write us about your conditions.

Special Wastes

If you have a disposal situation that involves production refuse, look into incineration. Many special Morse Boulger Destructors have been built to handle such difficult classes of waste as spoiled food products, fish and canning refuse, and heavy bakery garbage. Every such installation is designed especially for its job, from experience covering every conceivable kind of incineration. Send for information on what Morse Boulger can do for you.

Some of the Plants Where Morse Boulger Destructors Are Now in Use:—

Detroit Union Produce Terminal, Detroit
National Tea Company.....Chicago
Williamsport Growers' Market
Williamsport, Pa.
Nathan Schweitzer.....New York
Dugan Brothers' Bakeries....New York
Paul's Baking Company.....Chicago
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Typical Methods and the Interpretation of Results

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Associate Professor of Chemistry of Foods, Massachusetts Institute of Technology

557 pages, 5½ x 8, 110 illustrations, $3.50

IN THIS book the author has selected a variety of food materials calculated to illustrate the important methods of attack and the characteristic methods of analysis. Three classes of foods—fats and oils, carbohydrate foods and alcoholic beverages—have been treated at some length; general methods, common to the group, being taken up first in each case, followed by a more detailed discussion of several typical examples. The detection and identification of artificial colors has been treated fully.

In this third edition all data have been brought thoroughly up-to-date. Some of the methods have been changed to conform to the advances initiated by the referees of the Association of Official Agricultural Chemists.

Special emphasis is given to the importance of the interpretation drawn from the results of analysis.

Chapter Headings

1. General Methods. 2. The Microscopical Examination of Foods. 3. Food Colors and Preservatives. Chemical Preservatives. 4. Milk and Cream. 5. Edible Fats and Oils. Olive Oil. Butter. 6. Carbohydrate Foods. Maple Sirup. Honey. 7. Cocoa and Chocolate 8. Spices. Pepper. Cassia and Cinnamon. Cloves. Mustard. 9. Cider Vinegar. 10. Flavoring Extracts: Extract of Vanilla. Lemon Extract. Extract of Ginger. 11. Alcoholic Foods. Wine. Whiskey.

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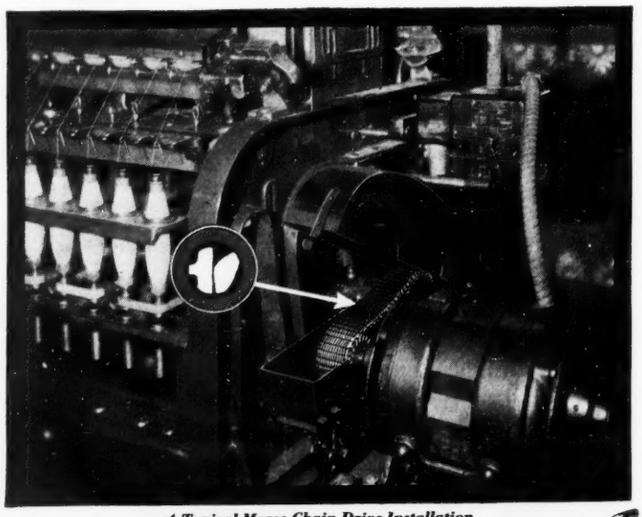

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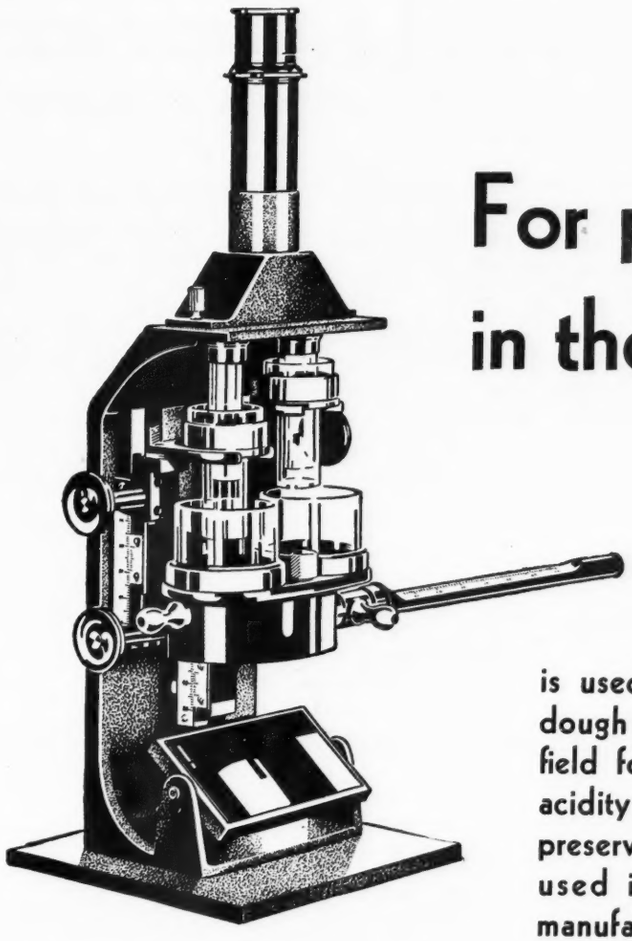

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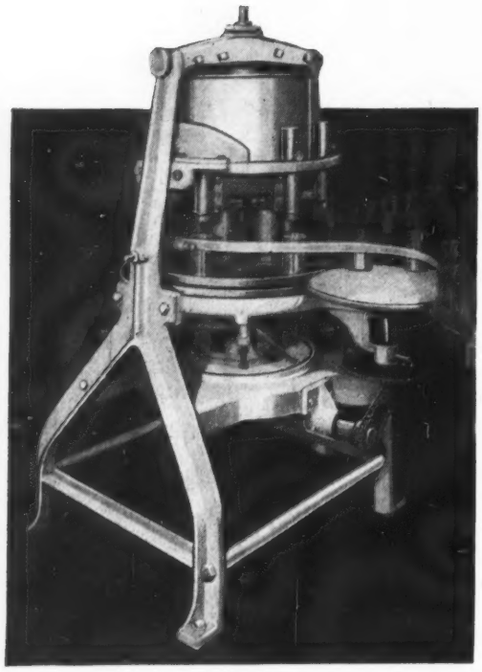

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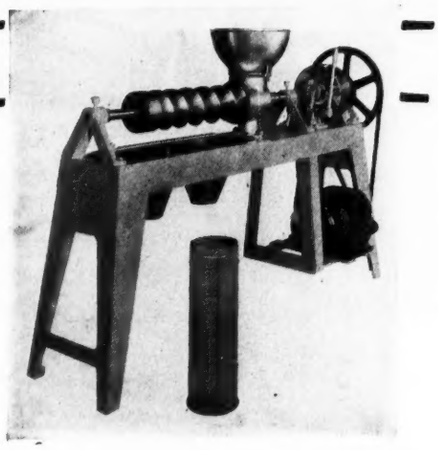

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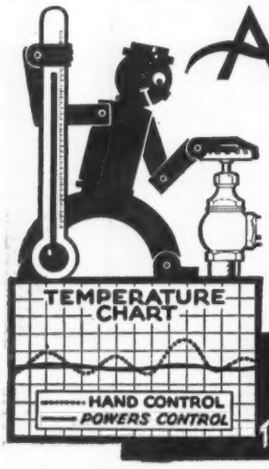

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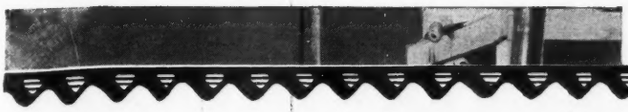

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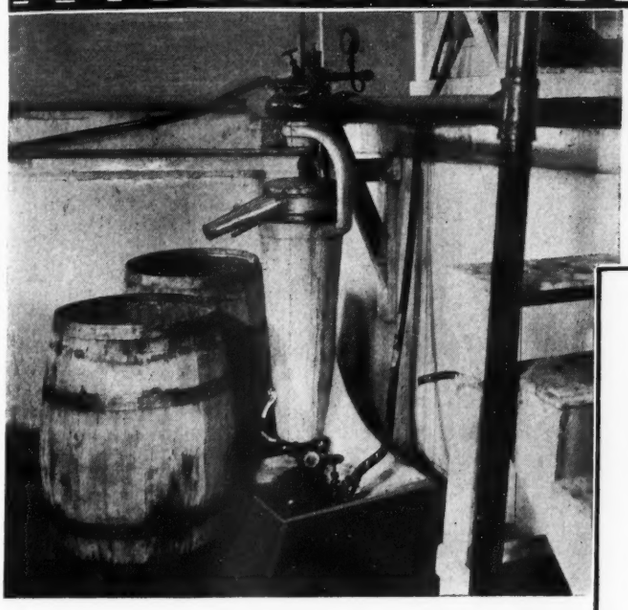

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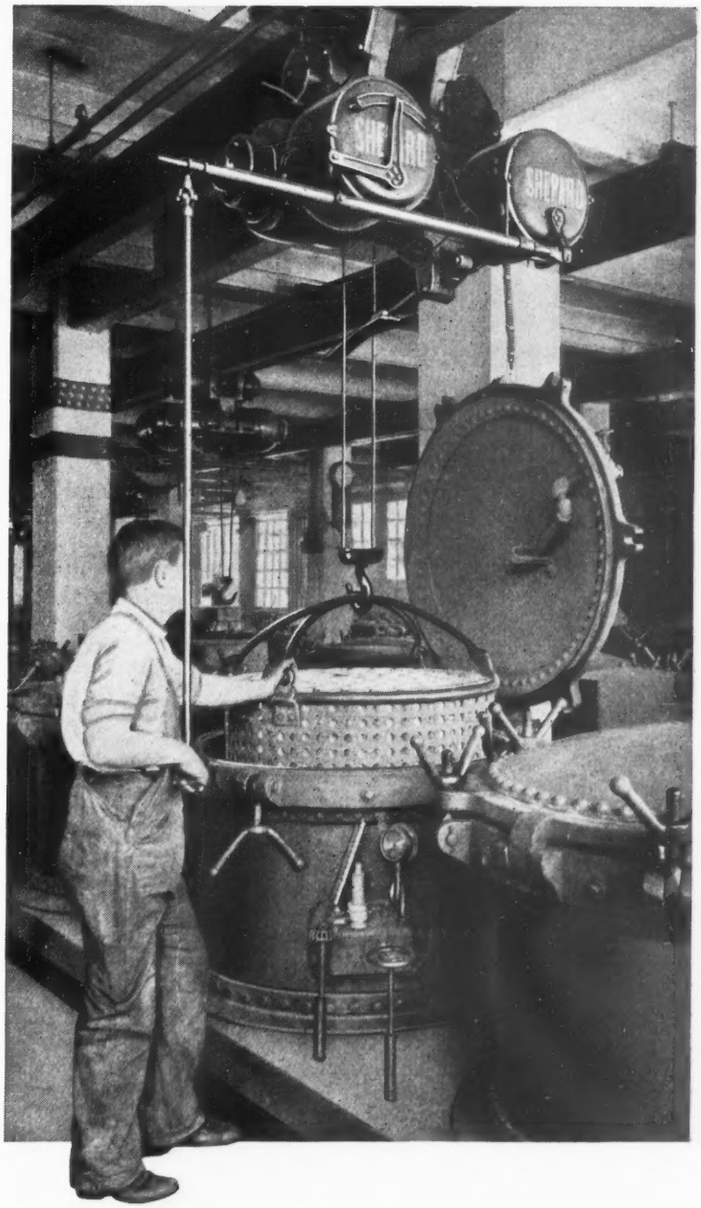

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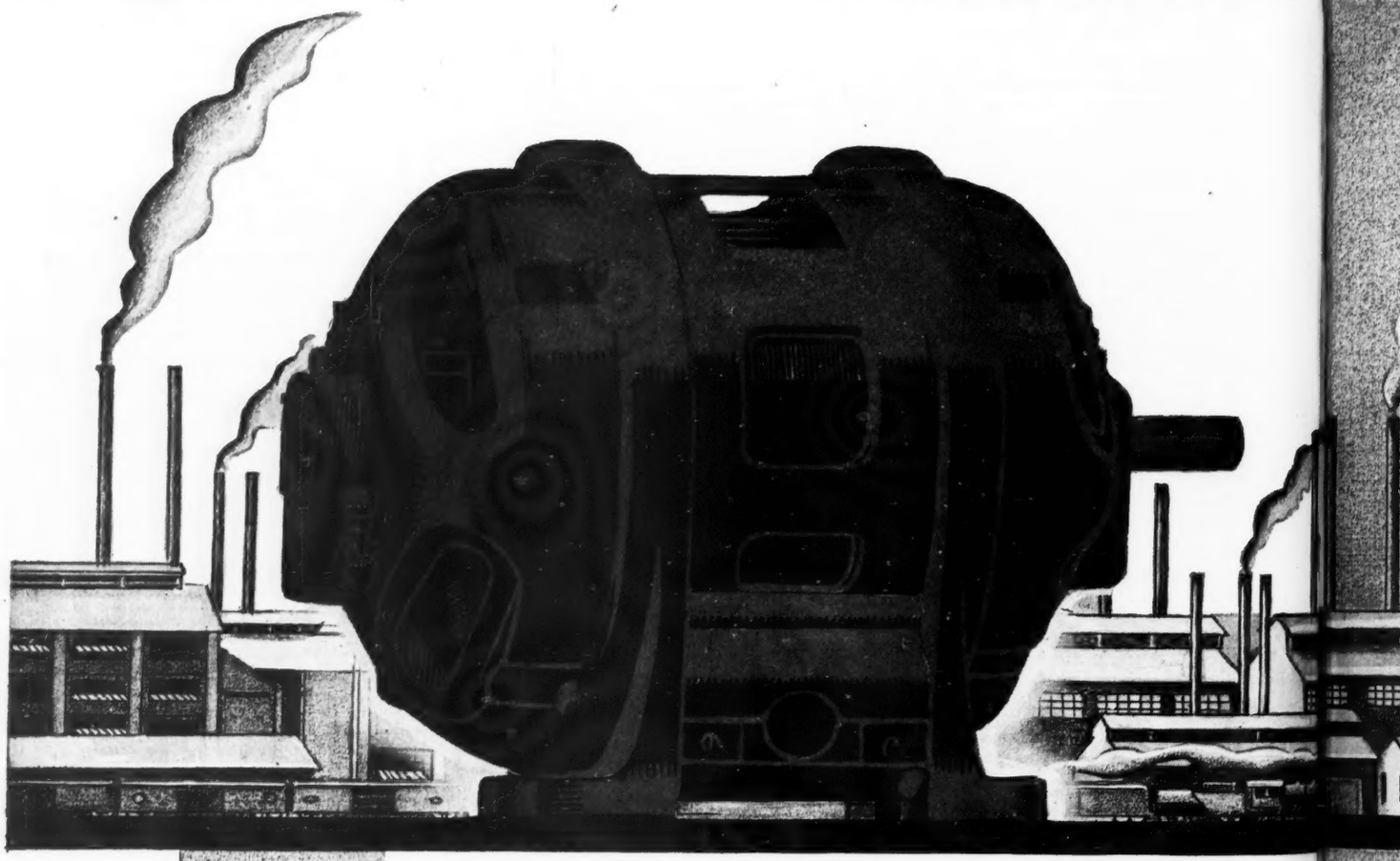

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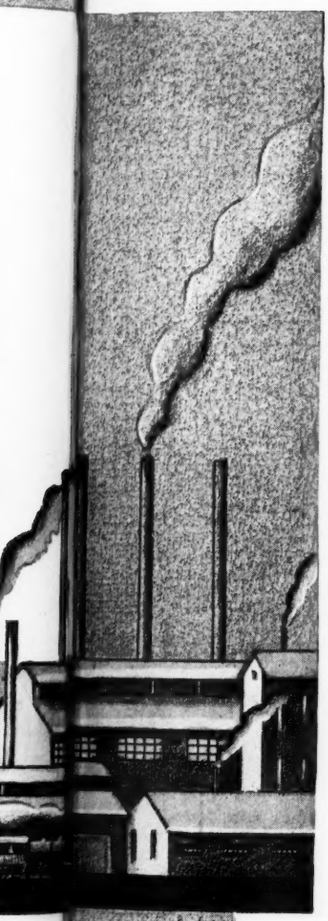

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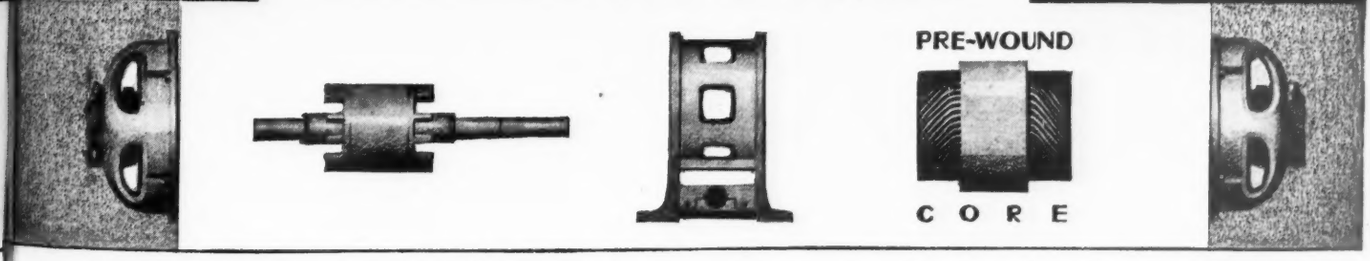

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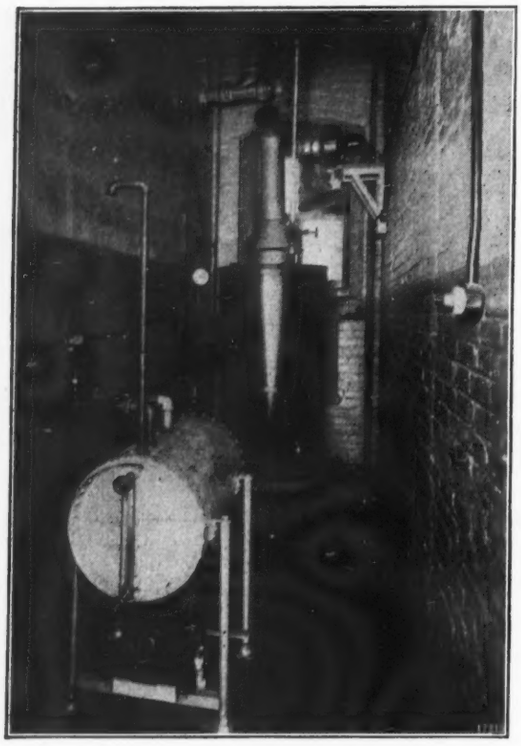

Saves $731.00 a Summer on Process Steam!

Shuts down large coal-fired heating boiler and uses 10 h.p.
KANE!

Above is shown a typical KANE process steam installation, consisting of a 10-h.p. KANE Gas Boiler and an M-K-O Automatic Boiler Feed and Condensation Return System—an installation you can duplicate for your own steam processes—

This installation (name on request) is especially noteworthy because there was obtained a *definite* saving of $731.00 a year *by shutting down a 150-h.p. coal fired heating boiler during the 85-day summer season,* relying entirely upon the 10-h.p. automatic KANE boiler for all processes requiring steam.

The actual cash investment in the KANE gas boiler and M-K-O Feed System plus installation costs, by careful estimates, here YIELDS A RETURN OF 77.8%. Such a return is decidedly impressive, but not exceptional, when KANE boilers are installed. Your own process steam problems can be solved *with proportionate gain to you,* if you anticipate these coming summer months, and install a KANE—or a battery of them! Let us give you further details.

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• TO ADVERTISERS •

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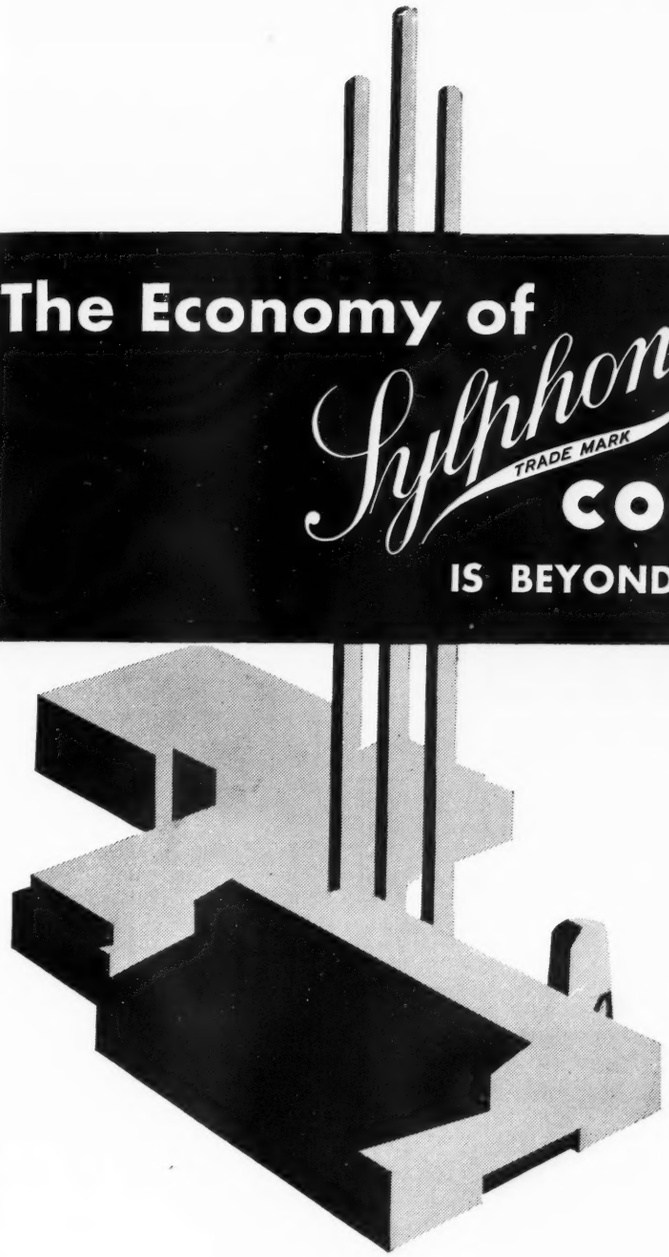
The Economy of Sylphon TRADE MARK control IS BEYOND QUESTION



●Advancing industry has quite generally endorsed the economic advantages of Sylphon Temperature Regulators. Over a long period of time and in a great number of installations the *Sylphon No. 930 Regulator*, controlling temperatures within very narrow limits, has won high acclaim for its value in special process work requiring frequent changes in temperature setting. By moving the weight along lever bar any previous setting may be positively duplicated.

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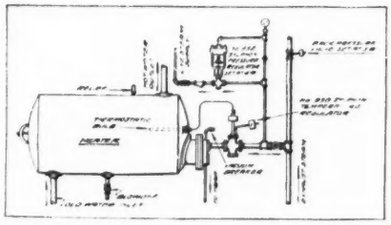
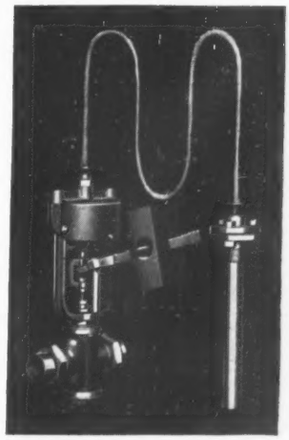
●Every Sylphon instrument contains as its thermostatic element our original, reliable Sylphon Bellows. It is our unqualified rule that all Sylphon Instruments must give satisfaction.

There Is a Sylphon Regulator for Your Particular Process



Our illustrated printed matter fully describes the complete Sylphon line of Regulators for the control of temperatures of liquids. Many installations are diagramatically shown and described. It is a treatise on temperature control that should be on the desk or in the file of every factory executive and engineer. Get your copy. Ask for Bulletin G G 125.

←No. 930 Regulator controlling exhaust steam to storage heater. No. 952 controlling live steam to supplement exhaust.



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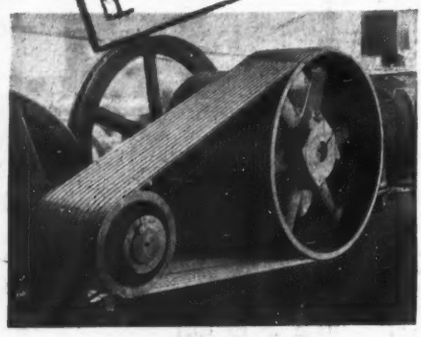

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